Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–IV EXAMINATION – WINTER 2015

Subject Code:X41101 **Date:18/12/2015**

Subject Name: Electronic Communication

Time: 02:30pm to 05:00pm **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 modulation. Explain different types of modulation.	**07**
	(b)	Explain the block diagram of super heterodyne receiver with the help of diagram.	**07**
Q.2	**(a)**	Draw the communication system block diagram and explain each block briefly.	**07**
	(b)	Define amplitude demodulation and explain envelope detector.	**07**
		OR	
	(b)	Derive the equation of amplitude modulated wave and draw the spectrum.	**07**
Q.3	**(a)**	Describe phase shift method of SSB generation.	**07**
	(b)	State Carson's rule. A carrier is frequency modulated by a sinusoidal modulating signal of frequency 2 KHz, it results in a frequency deviation Δf of 5 KHz. Find the BW occupied by the FM waveform. The amplitude of modulating sinusoid is increased by a factor of 3 and its frequency is lowered by 1 KHz. Find the new BW	**07**
		OR	
Q.3	**(a)**	Explain with the help of block diagram the Armstrong method of FM generation.	**07**
	(b)	Determine the power content of the carrier and each of the sidebands for an AM signal having a percent modulation of 80% and a total power of 2500 W.	**07**
Q.4	**(a)**	Define noise. What are the different types of noise? Explain any two.	**07**
	(b)	A cascaded 2-stage amplifier having first stage noise figure of 2 dB and a power gain of 12 dB. The second stage has a noise figure of 6dB and power gain of 10 dB. Find the overall noise figure in dB.	**07**
		OR	
Q.4	**(a)**	Derive the Friss's formula for cascaded amplifiers.	**07**
	(b)	What is thermal noise? An amplifier operating on a range from 18 to 20 MHz has a 10 kΩ input resistance. Find the rms noise voltage at the input to this amplifier if the ambient temperature is 27^0 C.	**07**
Q.5	**(a)**	Enlist all the properties of Fourier transform. Prove the time shifting property.	**07**
	(b)	Discuss the super-heterodyne receiver characteristics.	**07**
		OR	
Q.5	**(a)**	Find the Fourier transform of $x(t)=e^{-b\|t\|}\cos\omega_0 t$	**07**
	(b)	Define is image frequency. For a broadcast super-heterodyne AM receiver having no RF amplifier, the loaded Q of the antenna coupling circuit is 100. Now if intermediate frequency is 455 KHz, then determine the image frequency and its rejection ratio at an incoming frequency of 1000 KHz.	**07**

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