Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–IV EXAMINATION – SUMMER 2016

Subject Code:X41101 Date:26/05/2016

Subject Name:Electronic 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.**

Q.1	**(a)**	Define noise figure and noise temperature. A mixer stage has a noise figure of 20 dB and it is preceded by an amplifier with a noise figure of 9 dB and power gain of 15 dB. Calculate the overall noise figure referred to the input.	**07**
	(b)	Define amplitude modulation and modulation index. Derive expression for amplitude modulated wave.	**07**
Q.2	**(a)**	Explain Communication system with necessary block diagram.	**07**
	(b)	What is carrier synchronization? Explain Costa's loop.	**07**
		OR	
	(b)	Explain Foster-Seeley detector for FM detection with circuit and vector diagram.	**07**
Q.3	**(a)**	A certain transmitter radiates 9kW with carrier un-modulated and 12 kW when the carrier is sinusoidally modulated. Calculate the modulation index in case of AM. If another sine-wave corresponding to 40% modulation is transmitted simultaneously, Determine the total radiated power.	**07**
	(b)	Explain collector modulator for AM generation with necessary diagram.	**07**
		OR	
Q.3	**(a)**	What is multiplexing? Explain frequency division multiplexing in detail.	**07**
	(b)	Define frequency deviation. State Carson's rule. The modulating in FM is changed from 20kHz to 5kHz. Determine the change in BW if peak deviation is maintained at 50kHz.	**07**
Q.4	**(a)**	What is Parseval's Theorem for energy signals? Verify Parseval's theorem for energy signal $x(t) = e^{-at}u(t)$ (a>0).	**07**

	(b)	List all the properties of Fourier transform. Explain time-differentiation and convolution property in time domain.	**07**

OR

Q.4	**(a)**	Find the Fourier transform of the signal: $x(t) = e^{-5\|t\|}$	**07**
Q.4	**(b)**	Explain double conversion receiver with block diagram. What are the advantages of double conversion?	**07**
Q.5	**(a)**	What is noise? Define and Classify internal noise.	**07**
	(b)	Write short note on high frequency transformer.	**07**

OR

Q.5	**(a)**	Draw series tuned circuit and derive equation for resonant frequency and Q-factor.	**07**
	(b)	Write short note on Automatic Gain Control.	**07**

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