Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2023

Subject Code:3151104 Date:11-12-2023

Subject Name:Analog and Digital 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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Define following: 1) Amplitude modulation 2) Frequency modulation 3) Phase modulation	**03**
	(b)	State any four benefits of Modulation.	**04**
	(c)	Draw and Explain block diagram of Communication System.	**07**
Q.2	**(a)**	Show difference between AM and FM system.	**03**
	(b)	Discuss under modulation (undershoot), perfect modulation and over modulation (overshoot) for various value of modulation index.	**04**
	(c)	How AM waves are detected in Envelop Detector method.	**07**
		OR	
	(c)	The antenna current of an AM transmitter is 8 amperes (8A) when only the carrier is sent, but it increases to 8.93A when the carrier is modulated by a single sine wave. Find the percentage modulation and also determine the antenna current when the percent of modulation changes to 0.8.	**07**
Q.3	**(a)**	State difference between Single sideband and Double sideband amplitude modulation.	**03**
	(b)	State the difference between PCM, DPCM and Delta modulation.	**04**
	(c)	What is a super heterodyne receiver? Explain with block diagram.	**07**
		OR	
Q.3	**(a)**	State the Carson's rule and explain in brief.	**03**
	(b)	A modulating signal $10\cos(2\pi \cdot 30 \times 10^3 t)$; Angle modulated a carrier $Vc\cos(wc \cdot t)$. Calculate Modulation Index and bandwidth for the FM system. (Assume K_f = 15 kHz)	**04**
	(c)	Enlist various methods of FM generation. Explain any one of them.	**07**
Q.4	**(a)**	State 'Sampling Theorem'. Discuss Nyquist Rate of sampling.	**03**
	(b)	Explain mid-rise and mid-tread type of quantizer.	**04**
	(c)	State advantages and disadvantages of digital communication over analog communication.	**07**
		OR	
Q.4	**(a)**	Compare the On-off and Bipolar signaling for transmission of digital data.	**03**
	(b)	Describe the effect of slope overloading and hunting in delta modulation.	**04**
	(c)	Explain various type of sampling methods.	**07**

Q.5	**(a)**	Compare Amplitude Sift Keying (ASK) with Frequency Sift Keying (FSK).	**03**
	(b)	Given modulating bit stream is 10110011. Draw the ASK, FSK and BPSK signals. Also draw the waveforms for carrier and modulating bit stream.	**04**
	(c)	What is Line coding? Explain the different type of line coding techniques with suitable waveforms.	**07**

OR

Q.5	**(a)**	Give the full forms of following: 1) ISI, 2) PSD, 3) AMI	**03**
	(b)	Draw the signals for Unipolar NRZ, Unipolar RZ, Polar NRZ, Polar RZ for Data stream 10100111.	**04**
	(c)	State the importance of Regenerative repeater in digital communication and discuss briefly about the significance of individual components of Regenerative repeater.	**07**

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