Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI (NEW) EXAMINATION – WINTER 2024

Subject Code:3163206 Date:20-11-2024

Subject Name:Analog and Digital Communication

Time:02:30 PM TO 05:00 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)**	Write the importance of the modulation of communication.	**03**
	(b)	Classify the communication techniques.	**04**
	(c)	Explain the classification of the noise and drive the expression for noise voltage	**07**
Q.2	**(a)**	What is modulation index in amplitude modulation? Derive the mathematical equation of AM modulated wave.	**03**
	(b)	What is coherent demodulation of binary ASK.	**04**
	(c)	Derive mathematical representation of Amplitude Modulation and explain the signification of Modulation Index with necessary waveforms	**07**
		OR	
	(b)	Explain the working of amplitude demodulator circuit with the remedy for avoiding diagonal peak clipping and negative peak clipping	**07**
Q.3	**(a)**	Explain the types of FM demodulation techniques?	**03**
	(b)	What are coherent digital modulation techniques?	**04**
	(c)	For the FM System, the modulating frequency is 4 KHz and the maximum frequency deviation is 20 KHz. Calculate modulation index β and bandwidth of the system using Carson's Rule.	**07**
		OR	
Q.3	**(a)**	Explain the importance of Pre-emphasis and De-emphasis circuits in FM. Sketch a typical Pre-emphasis and De-emphasis circuit	**03**
	(b)	What is FSK? Draw the block diagram for FSK detection.	**04**
	(c)	The modulating signal in an FM wave is 500 Hz with amplitude of 3.2 Volt and frequency deviation is 6.4 kHz. If the audio freq. voltage is now increased to 8.4 volt determine the new frequency deviation and modulation index.	**07**
Q.4	**(a)**	Explain the relation phase and frequency modulation.	**03**
	(b)	Draw the AM transmitter and explain the working of each block.	**04**
	(c)	Draw the block diagram of Superheterodyne Receiver and explain its operation.	**07**

OR

Q.4	**(a)**	Explain the feature of a radio receiver.	**03**
	(b)	Draw the circuit diagram of delayed AGC and explain its operation.	**04**
	(c)	Draw the general block diagram of TRF receiver and briefly explain the function of each block.	**07**
Q.5	**(a)**	Compare DPCM and PCM.	**03**
	(b)	Explain the PCM modulation technique and mentioned the merits.	**04**
	(c)	What is CDMA? How it differs from FDMA and TDMA.	**07**

OR

Q.5	**(a)**	What are the problems associated with Delta Modulation	**03**
	(b)	Explain the Pulse Width Modulation transmitter operation	**04**
	(c)	Explain Frequency Hopping with necessary waveforms. Also write the importance applications of FHSS.	**07**

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