Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – SUMMER 2024

Subject Code: 3151104 Date:21-05-2024

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)**	Explain the need of modulation.	**03**
	(b)	Justify: Noise immunity of digital communication system is better than analog communication system.	**04**
	(c)	What are the advantages of Single Side Band (SSB) modulation over Double Side Band (DSB) modulation? Explain filter method to generate SSB signal.	**07**
Q.2	**(a)**	Explain the working of pre-emphasis network in Frequency Modulation.	**03**
	(b)	Compare: Amplitude Modulation and Frequency Modulation.	**04**
	(c)	Explain the working of Phase Locked Loop (PLL).	**07**
		OR	
	(c)	Explain different types of signal distortions over a communication channel.	**07**
Q.3	**(a)**	A broadcast AM transmitter radiates 50 KW of carrier power. What will be the radiated power at 85 % modulation?	**03**
	(b)	For baseband pulse 110100, draw the waveforms of ASK, FSK and PSK.	**04**
	(c)	Explain how FM signal is generated using Indirect method of Armstrong.	**07**
		OR	
Q.3	**(a)**	An FM wave is given by $e(t) = 20 \cos[6 \times 10^8 t + 7 \sin 1250t]$. Determine (i) The carrier frequency (ii) Modulating frequency (iii) The maximum deviation.	**03**
	(b)	Compare binary ASK, FSK and PSK.	**04**
	(c)	Explain how the envelope detector demodulates AM signals. Also indicate the difference between the rectifier detector and the envelope detector.	**07**
Q.4	**(a)**	Explain the principle of non uniform quantization.	**03**
	(b)	Explain the applications of Eye diagram.	**04**
	(c)	What is aliasing? How aliasing can be eliminated?	**07**
		OR	
Q.4	**(a)**	Find the Nyquist rate and Nyquist interval for the signal $x(t) = 10 \cos 3000\pi t \cos 1000\pi t$	**03**
	(b)	Explain the properties of line codes.	**04**
	(c)	Explain the working of delta modulation with the help of block diagram. Discuss the disadvantages of delta modulation.	**07**

Q.5	**(a)**	Compare: Unipolar, polar and bipolar line codes.	**03**
	(b)	What are the advantages of digital communication over analog communication?	**04**
	(c)	Derive the power spectral density (PSD) of polar NRZ line code.	**07**

OR

Q.5	**(a)**	Explain the working of regenerative repeater in digital communication system.	**03**
	(b)	Explain the operation of sample and hold circuit.	**04**
	(c)	Explain the cause of intersymbol interference (ISI) in digital communication systems? Explain Nyquist criterion for zero ISI.	**07**

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