Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(NEW) – EXAMINATION – SUMMER 2019

Subject Code:2161001 Date:10/05/2019

Subject Name: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.**

			MARKS
Q.1	**(a)**	State and prove the Chebychev's inequalities.	**03**
	(b)	Derive mean and variance of the uniform random variable.	**04**
	(c)	Define CDF and PDF. State and prove the properties of CDF.	**07**
Q.2	**(a)**	Explain Shannon fano coding procedure with suitable example.	**03**
	(b)	Explain the difference between Source coding and Channel coding.	**04**
	(c)	A memory less source emits message m_1 and m_2 with the probability 0.8 and 0.2 respectively. Find the compact binary code for this source as well as for its second and third order extension. Determine the code efficiency in each case.	**07**
		OR	
	(c)	Derive the capacity of band limited AWGN channel and show that capacity **C = B log (1+ S / N)**	**07**
Q.3	**(a)**	Explain μ- law companding.	**03**
	(b)	Derive the Expression of quantization error.	**04**
	(c)	What is the difference between Delta modulation and Adaptive delta modulation? What is the condition for avoiding slope overload error?	**07**
		OR	
Q.3	**(a)**	What are the advantage and disadvantage of PCM system?	**03**
	(b)	State and prove the sampling theorem for the low pass signal.	**04**
	(c)	Write a short note on: Differential pulse code modulation.	**07**
Q.4	**(a)**	What is eye diagram? Explain using necessary diagram.	**03**
	(b)	Draw and explain coherent BPSK receiver.	**04**
	(c)	What are the different parameter that should be examined for the selection of the line codes? Explain each in brief.	**07**
		OR	
Q.4	**(a)**	What is the difference between AM signal and ASK signal.?	**03**
	(b)	Give the comparison between BPSK and DPSK.	**04**
	(c)	Write a short note on: Duo binary encoding.	**07**
Q.5	**(a)**	Define Noise Figure, Noise temperature.	**03**
	(b)	Generator matrix of (6,3) block code is given as below. Find all code vector of this code. $G = \begin{vmatrix} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 1 & 1 \end{vmatrix}$	**04**
	(c)	Write a short note on Burst error correcting codes.	**07**
		OR	
Q.5	**(a)**	Derive the expression for the error probability of ASK signal.	**03**
	(b)	Find the generator polynomial g(x) of (7,4) cyclic code and find the code vector for the following data vector : 1010, 1111, 1000	**04**
	(c)	Write a short note on convolutional code.	**07**

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