Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER I (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2714106 **Date:17/05/2016**

Subject Name: Digital Modulation and Coding

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.**

Q.1	**(a)**	Describe M-ary PAM in detail with derivation for energy of modulated signals, minimum euclidean distance and signal space/Constellation diagrams for M= 2,4,8.	**07**
	(b)	With a suitable example, explain encoding and decoding of (6,3) linear block code.	**07**
Q.2	**(a)**	Explain M-ary PSK in detail with derivation for energy of modulated signals, minimum euclidean distance and signal space/Constellation diagrams for M= 2,4,8.	**07**
	(b)	Compare FDMA & TDMA and briefly explain CDMA basics.	**07**
		OR	
	(b)	Discuss standard array decoding of linear block codes with suitable example.	**07**
Q.3	**(a)**	Describe burst error correcting code in detail.	**07**
	(b)	Describe MFSK signal constellation diagrams for orthogonal and bi-orthogonal signals.	**07**
		OR	
Q.3	**(a)**	Write a short note on: OQPSK.	**07**
	(b)	Explain C.P.F.S.K as a particular class of C.P.M with necessary derivation and show that it is a modulation scheme with memory.	**07**
Q.4	**(a)**	Write a short note on: LDPC codes.	**07**
	(b)	Describe the encoding of rate R= ½ NON-SYSTEMATIC FEEDFORWARD (2,1,3) convolution encoder in time as well as transform domain.	**07**
		OR	
Q.4	**(a)**	Write a short note on BCH codes.	**07**
	(b)	Discuss the fundamental ideas behind construction of turbo codes and explain basic turbo encoding structure.	**07**
Q.5	**(a)**	Explain encoding and decoding of systematic (7,4) cyclic code with suitable example.	**07**
	(b)	Describe Reed Solomon codes.	**07**
		OR	
Q.5	**(a)**	(i) Compare TDM with FDM.	**03**
		(ii) What are PCBC & PCCC? Draw (2,1,3) convolution encoder with generator matrix G (D) = [1 $1+D+D^3$]	**04**
	(b)	Discuss iterative decoding of turbo code with 2-state (2,1,1) encoder with generator matrix G (D)=[1 1/(1+D)] using log-MAP algorithm.	**07**

****