GUJARAT TECHNOLOGICAL UNIVERSITY ME Semester –II Examination Dec. - 2011

Subj	Subject code: 1722202 Date: 12/1		
Subj Time	ect f e: 02	02.30 pm – 05.00 pm Total Ma	
Instructions: 1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks.			
Q.1	(a) (b)	Enlist the properties of Hilbert Transform. Explain orthogonal and orthonormal signals. How does Gram-Schmidt	07 07
Q.2	(a)	Explain following processes with example.	07
	(b)	 (i)Stationary (ii) Wide-sense Stationary (iii) Ergodic. π/4-QPSK may be considered as two QPSK systems offsets by π/4 radians. (a) Sketch the signal space diagram for a π/4-QPSK signal. (b) Using Gray coding, label the signal points with the corresponding data bits. 	07
	(b)	OR Consider the four signals $s_1(t), s_2(t), s_3(t)$ and $s_4(t)$ given by the relation: $S_i(t) = \sqrt{2P_s} \cos [w_0t + (2i-1) \pi/4]$ Where $i = 1, 2, 3, 4$ for $0 \le t \le T$. Assume $2w_0t = n\pi$. (a) Find a set of orthonormal coordinates.	07
Q.3	(a)	(b) Plot the four signals using the orthonormal coordinates. Compare MSK, Offset-QPSK and QPSK with reference to rectangular pulse of duration $0 \le t \le 2T$	07
	(b)	Determine the autocorrelation of the stochastic process $X(t) = Asin(2\pi f_c t+\theta)$ Where f_c is a constant and θ is a uniformly distributed phase, i.e, $P(\theta)=1/2\pi$, $0 \le \theta \le 2\pi$	07
Q.3	(a)	Draw signal space diagram of 2 component CPFSK with $h=1/4$, $1/3$, $1/2$ and $2/3$	07
	(b)	In the MSK signal ,the initial state for the phase is either 0 or π rad. Determine the terminal phase state for the following four inputs pairs of input data:	07
0.4	(a)	a) 00 b) 01 c) 10 d) 11 Explain Costas loop.	07
C.	(b)	Explain difference between decision directed and non decision directed loops.	07
04	(a)	OR Compare Probability of hit error for binary and four phase PSK and DPSK s	07
ч .т	(a) (b)	Explain parallel transmission under fading channel.	07
Q.5	(a)	Explain SNR advantage of M-ary QAM over M-ary PSK	07
	(b)	Explain Advantages of OFDM.	07
0.5	(8)	Determine the joint ML estimate of τ and ϕ for offset OPSK.	07
Q 10	(b)	A Matched filter has the frequency response $H(f) = (1-e^{-2\pi fT})/j2\pi f$	07
		a) Determine the impulse response h(t) corresponding to H(f).b) Determine the signal waveform to which the filter characteristic is matched.	
