Exam.Code:0969
Sub. Code: 7338

1128

M. E. (Electronics and Communication Engineering)

First Semester

ECE-1103: Advanced Digital Communication

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part.

x-x-x

1.	i.	Write down the equation of Low-Pass equivalent of Band-Pass signal.	1x10=10
	ii.	Full form of CPM is _____.	
	iii.	QAM is _____ (memoryless modulation scheme or modulation scheme with memory).	
	iv.	Write down the formula for maximum likelihood rule for optimum detection of general vector channel.	
	v.	Does the optimality of receiver changes with Invertible preprocessing of the received information (Yes/No)	
	vi.	What is the requirement to maintain the orthogonality of two signals?	
	vii.	The capacity of an ideal, band limited AWGN channel is _____.	
	viii.	Define one-shot estimate.	
	ix.	Which two parameters are estimated in carrier & symbol synchronization?	
	x.	Fine Synchronization of FHSS is also known as _____.	
		Part A	
2.	(a)	What are different blocks of digital communication? Also state their characteristics.	5, 5
	(b)	Explain signal space representation of waveforms and plot the orthonormal basis functions of the following: 	
3.	(a)	Explain QAM. Derive the expression for d_{min} and compare with Baseband PAM.	5,5
	(b)	Draw State Trellis and State Diagram for a full response CPFSK with h = 1/2	
4.	(a)	Discuss implementation of the optimal receiver for AWGN channels with N correlators and M correlators and compare both implementations.	5,5
	(b)	A radio transmitter has a power output of P_T = 0.1W at a frequency of 1GHz. The transmitting and receiving antennas are parabolic dishes with each having diameter 1m. if the distance between transmitter and receiver antenna is 20Km, determine (i) antenna gains of transmitting and receiving antennas; (ii) EIRP of the transmitted signal; (iii) signal power from receiving antenna.	
		Part B	
5.	(a)	What is symbol timing estimation? Discuss non-decision directed estimation of timing for baseband PAM with diagram.	5,5
	(b)	Discuss the effect of additive noise on the phase estimation with derivation.	
6.	(a)	Differentiate between Multichannel and Multicarrier communication system with suitable example.	5, 5
	(b)	Give spectral characteristics of multicarrier signal and briefly explain Bit and power allocation in multicarrier modulation.	
7.	(a)	What is spread spectrum? Explain fast frequency hopping spread spectrum with diagram.	5, 5
	(b)	An 10 ML shift register is used to generate the pseudorandom sequence in a DSSS. The chip duration T_c = 1 μs and bit duration $T_b = NT_c$ where N is the length of the m sequences. Determine the processing gain of the system in dB and jamming margin if the required E_b/J_0 = 10.	