Exam.Code:0969
Sub. Code: 34526

2125

M.E. (Electronics and Communication Engineering)
First Semester
ECE-1103: Advanced Digital Communication
(For UIET Only)

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.	The channel which adds noise following Gaussian distribution is called _____ channel.	1x10
	ii.	In signal space representation, each signal waveform is represented as a _____ in a multi-dimensional space.	
	iii.	The correlation between two signals is used to measure their degree of _____.	
	iv.	In memoryless modulation methods, each symbol is transmitted _____ of previous symbols.	
	v.	In CPFSK, the phase of the carrier signal changes _____.	
	vi.	The matched filter receiver maximizes the _____ ratio at the sampling instant.	
	vii.	A phase-locked loop (PLL) is used for _____ recovery and symbol synchronization	
	viii.	OFDM stands for _____.	
	ix.	In CDMA, multiple users share the same frequency band using distinct _____ codes.	
	x.	The likelihood function is used in maximum likelihood estimation to determine the most probable _____ value.	
		PART A	
2.	(a)	Explain bandpass and lowpass signals. Give suitable mathematical representations and examples of each.	5, 5
	(b)	Explain the necessary conditions that a set of signals must satisfy to be considered orthonormal. Apply the Gram–Schmidt orthonormalisation procedure to a given set of signals and demonstrate the step-by-step process with a suitable example.	
3.	(a)	Derive the mathematical expression for the minimum Euclidean distance between constellation points in Phase Shift Keying (PSK) signals. Analyse how this distance affects the probability of error in PSK systems.	5, 5
	(b)	Draw the state trellis & state Diagram for CPFSK with h=1/2 for the bit sequence [1, 0, 1, 1].	
4.	(a)	How is a matched filter receiver implemented for AWGN Channels? Explain the frequency domain interpretation of this type of matched Filter.	5, 5
	(b)	Give a performance analysis for a wire-line communication system.	
		PART B	
5.	(a)	What is Maximum Likelihood (ML) Timing Estimation? Explain its significance in digital communication systems.	5, 5
	(b)	Explain the non-decision-directed loop for carrier phase estimation.	
6.	(a)	Describe à multicarrier communication system that employs the FFT algorithm at the transmitter and receiver	5, 5
	(b)	Differentiate single-carrier modulation from multicarrier modulation.	
7.	(a)	What are spread-spectrum systems? Explain the Direct Sequence Spread Spectrum system with a neat diagram.	5, 5
	(b)	Explain coarse synchronisation of the FHSS system with a neat diagram.	

x-x-x