Reg. No.												

Question Paper Code	12355

B.E. / B.Tech - DEGREE EXAMINATIONS, NOV / DEC 2023

Fifth Semester

Electronics and Communication Engineering

20ECPC501 - DIGITAL COMMUNICATION

(Regulations 2020)

Duration: 3 Hours Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level, CO
1.	State Shannon-Hartley Theorem.	2,K1,CO1
2.	What is meant by discrete memory less source?	2,K1,CO1
3.	What are the advantages of Huffman source code over Shannon Fano Codes?	2,K1,CO2
4.	State the Source coding Theorem.	2,K1,CO2
5.	Summarize the need of Line Codes.	2,K1,CO3
6.	What is linear predictor? On what basis predictor coefficients are determined?	2,K1,CO3
7.	State the need for precoding in Duo binary system.	2,K1,CO4
8.	Outline the necessity of equalization.	2,K1,CO4
9.	Define carrier synchronization.	2,K1,CO5
10.	Identify the difference between BPSK and QPSK techniques.	2,K2,CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	Explain entropy along with its properties.	13,K2,CO1
		OR	
	b)	(i) State and explain channel coding theorem.	6,K2,CO1
		(ii) Write short notes on Information and its properties.	7,K2,CO1
12.	a)	A DMS has six symbols x1, x2, x3, x4, x5, x6 with probability of emission 0.2,0.3,0.11,0.16,0.18,0.05 encode the source with Huffman codes and compute its efficiency.	13,K3,CO2
		OR	
	b)	Consider a discrete source that emits the symbols {x1, x2, x3, x4, x5, x6, x7, and x8} with probabilities {0.48, 0.15, 0.1, 0.1, 0.07, 0.05, 0.03, 0.02}. Construct a binary code using Shannon-Fano technique. Compute the efficiency of the code.	13,K3,CO2

13. a) (i) What is the need for Adaptive Delta Modulation and how it overcomes the drawback of delta modulation? *6,K2,CO3*

(ii) Explain the features of adaptive delta modulation with transmitter and receiver. *7,K2,CO3*

OR

b) Explain the principle, generation and reconstruction of DPCM System in detail. *13,K2,CO3*

14. a) Elaborate how ISI occurs in base-band binary data transmission systems? *13,K2,CO4*

OR

b) Explain in detail the principle of matched filter and Correlation filter. *13,K2,CO4*

15. a) (i) Draw the transmitter, receiver block diagram of QPSK. *7,K2,CO5*

(ii) Explain its signal space diagram and Band width in detail. *6,K2,CO5*

OR

b) Compare coherent and non-coherent receiver and explain with its block diagram. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) The Generator Matrix for a (6, 3) block code is given below. Find all code vectors of this code. *15,K3,CO6*

$$\begin{vmatrix} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{vmatrix}$$

(i) Determine P sub matrix from generator matrix.
(ii) Obtain equation for check bits using C=MP.
(iii) Determine check bits for every message vector.
(iv) Decode 111011 using syndrome Decoding.
(v) Prove that syndrome can detect only one error.

OR

b) A 1/3 rate Convolutional code has the following generators g_1=[100], g_2=[101] and g_3=[111]. *15,K3,CO6*

(i) Draw the Encoder circuit corresponding to the code.
(ii) Draw the state transition diagram for this code.
(iii) Draw the state diagram for this code.
(iv) Draw the Trellis diagram for this code.