Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APR / MAY 2024

Electronics and Communication Engineering
Semester
EC5502 - DIGITAL COMMUNICATION
(Regulation 2019)

Time:3 hrs Max. Marks: 100

CO1	Ability to analyze baseband signaling schemes and their special characteristics
CO2	Ability to apply error control coding schemes and analyze its performance
CO3	Ability to encode and decode source symbols and determine the channel capacity
CO4	Ability to analyze pass band signaling schemes and its spectral and BER characteristics
CO5	Ability to describe the principles of synchronization and spread special techniques

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A (10x2=20Marks)
(Answer all Questions)

Q. No.	Questions	Marks	CO	BL
1	What is sampling and quantization?	2	1	L2
2	Compare unipolar and RZ code for the binary data 01101001.	2	1	L4
3	State Channel Coding Theorem and its need.	2	2	L1
4	Distinguish Hamming Distance and Hamming weight.	2	2	L4
5	State entropy. Write the two properties of entropy.	2	3	L1
6	What is mutual information? List out the properties of mutual information.	2	3	L3
7	What is QPSK? Write down the expression for the QPSK signal.	2	4	L3
8	Distinguish the error probability for BPSK and QPSK.	2	4	L3
9	Write the classification of direct sequences spread spectrum.	2	5	L4
10	What is called processing gain?	2	5	L1

PART- B (5x 13=65Marks)

(Restrict to a maximum of 2 subdivisions)

Q. No.	Questions	Marks	CO	BL
11 (a)	Describe about the generation and detection of Flat top PAM.	13	1	L1
	OR			
11 (b)	What is the need for line coding of signals? Explain on the	13	1	L1

12 (a)	Illustrate how the errors are corrected using hamming code with an example.	13	2	L2
	OR			
12 (b)	Compare linear block codes and convolutional codes. State the advantages, disadvantages and applications of convolutional codes.	13	2	L2
13 (a)	A source generates five messages m_0, m_1, m_2, m_3 and m_4 with probabilities 0.55,0.15,0.15,0.10 and 0.05 respectively. The successive messages emitted by the source are statistically independent. Determine the code words for the messages and efficiency using Shannon Fano Algorithm.	13	3	L3
	OR			
13 (b)	Calculate the Huffman code for a discrete memoryless source with probability statistics {0.1,0.1,0.2,0.2,0.4}. Identify the drawbacks of Huffman coding.	13	3	L3
14 (a)	Compare the BER of coherent PSK, coherent QPSK and coherent FSK.	13	4	L4
	OR			
14 (b)	Explain the power spectral density and bandwidth of QAM signal with neat diagrams and mention its advantages.	13	4	L4
15 (a)	Describe in detail about generation of PN codes. Discuss the properties of PN sequences.	13	5	L3
	OR			
15 (b)	Explain the principle of operation of FHSS with necessary diagrams. Also Compare fast frequency hopping and slow frequency hopping.	13	5	L3

PART- C (1x 15=15Marks)

(Q.No.16 is compulsory)

Q. No.	Questions	Marks	CO	BL
16.	Summarize Spread Spectrum modulation technique based upon the operating concept and compare about DSSS and FHSS.	15	5	L5