SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR

(AUTONOMOUS)

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QUESTION BANK (DESCRIPTIVE)

Subject with Code:DC (19EC0415) **Course & Branch**: B. Tech& ECE
Year & Sem: III-B.Tech& I-Sem **Regulation:** R19

UNIT –I

Introduction &Source Coding Systems

1.	a)	Explain the DPCM system with neat diagram?	[L2] [CO1] [8M]
	b)	What are the advantages & disadvantages of DPCM?	[L1] [CO1] [4M]
2.	a)	Compare PCM, DPCM, and DM?	[L2] [CO1] [8M]
	b)	List the Advantages of DM	[L1] [CO1][4M]
3.	a)	Explain the delta modulation system with suitable diagrams?	[L2] [CO1][8M]
	b)	Explain Slope overload Distortion & Granular Noise?	[L2] [CO1] [4M]
4.	a)	With a neat block diagram explain PCM transmitter and receiver?	[L2] [CO1][8M]
	b)	What are the advantages & disadvantages of PCM?	[L1] [CO1] [4M]
5.	a)	Discuss the Noise considerations in PCM systems?	[L2] [CO1][6M]
	b)	Draw and explain the block diagram of regenerative repeaters?	[L1] [CO1][6M]
6.	a)	Derive the quantization noise in PCM?	[L3] [CO1][6M]
	b)	Derive the S/N ratio of PCM?	[L3] [CO1] [6M]
7.	a)	State sampling theorem.	[L1] [CO1][6M]
	b)	Consider an audio signal consisting of the sinusoidal term given as $x(t) = 3\cos(500\pi t)$ i) Determine the SNR noise ratio. When this is quantized using 10 bits PCM. ii) How many bits of quantization are needed to achieve a SNR ratio of at least 40dB?	[L3] [CO1][6M]
8.	a)	Explain the Process of Quantization through one Example?	[L2] [CO1][6M]
	b)	Discuss the different types of Quantization in Detail?	[L2] [CO1][6M]
9.	a)	Draw the block diagram of digital communication system? Explain each block?	[L1] [CO1][6M]
	b)	A Television signal having a bandwidth of 4.2 MHz is transmitted using binary PCM system. Given that the number of quantization levels is 512. Determine i) Codeword length? ii)Transmission Bandwidth? iii) Final Bit rate? iv) Output SNR ratio?	[L3] [CO1][6M]
10.	a)	Explain fundamental limitations of Communication Systems	[L2] [CO1][6M]
	b)	Compare Analog and Digital Communication	[L2] [CO1][6M]

UNIT –II

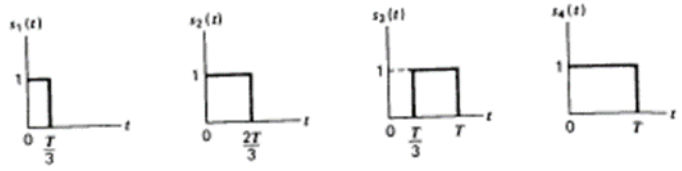
BASEBAND PULSE TRANSMISSION

1.	a)	Explain the matched filter.	[L2] [CO2][6M]
	b)	Derive the properties of matched filter.	[L3] [CO2]6M]
2.		Explain in detail about Inter symbol interference and its effects?	[L2] [CO2][12M]
3.	a)	Describe the baseband M-array PAM Transmission system.	[L1] [CO2][6M]
	b)	Explain in detail about modified duo binary signaling scheme?	[L2] [CO2][6M]
4.	a)	What is ISI? Draw the basic block diagram of baseband binary data transmission	[L1] [CO2][6M]
	b)	Explain the rectangular pulse for a matched filter?	[L2] [CO2][6M]
5.		Derive the expression for the Nyquist criterion for distortion less baseband Transmission in the absence of noise in terms of time domain & Frequency domain.	[L3] [CO2][12M]
6.	a)	Derive the expression for impulse response of a matched filter.	[L3] [CO2][6M]
	b)	What are the remedies to reduce ISI.	[L1] [CO2][6M]
7.		A polar NRZ waveform has to be received into the help of a matched filter. Here binary '1' is represented as a rectangular positive pulse. Also, binary '0' is represented by a rectangular negative pulse. determine the impulse response of the matched filter. Also sketch it.	[L3] [CO2][12M]
8.		What is correlative coding? Explain its types.	[L2] [CO2][12M]
9.	a)	What are the effects of ISI?	[L1] [CO2][6M]
	b)	Describe Eye pattern and construct the diagram.	[L2] [CO2][6M]
10.		Explain duo-binary signaling scheme through one example.	[L2] [CO2][12M]

UNIT –III

Signal Space Analysis

1.	a)	What is Gram-Schmidt orthogonalization procedure? Explain	[L1] [CO3] [6M]
	b)	Discuss about signal constellation diagram.	[L2] [CO3] [6M]
2.		Describe the concept of continuous AWGN channel into a vector channel.	[L2] [CO3][10M]
3.		Consider the signals $s_1(t)$, $s_2(t)$, $s_3(t)$, $s_4(t)$, shown in fig. Find the orthogonal basis function using Gram Schmidt orthogonalization procedure	[L3] [CO3] [10M]



4.		Draw the block diagram of the structure and behavior of Matched filter Receiver?	[L1] [CO3] [12M]
5.	a)	Explain the concept of Schwarz Inequality	[L2] [CO3][6M]
	b)	Explain signal representation of a signal N=2and M=3.	[L2] [CO3][6M]
6.	a)	What is the concept of orthogonal basis function?	[L1] [CO3][6M]
	b)	Explain the Orthogonality basis function.	[L2] [CO3][6M]

7.	a)	Draw the block diagram of a most basic form of digital communication system.	[L1] [CO3][6M]
	b)	Illustrate optimum receiver for AWGN channel?	[L2] [CO3][6M]
8.	a)	a) Sketch the signal constellation diagrams for N=M=2	[L3] [CO3][6M]
	b)	b) Explain the geometrical representation of signals.	[L2] [CO3][6M]
9.		Explain the following i) Additive White Gaussian noise? ii) Orthogonality? iii) Signal vector? iv) Synthesizer?	[L2] [CO3][12M]
10.	a)	Explain the concept of AWGN channel.	[L2] [CO3] [6M]
	b)	With a neat sketch explain the working of correlation receiver.	[L2] [CO3][6M]

UNIT –IV

Passband Data Transmission

1.	a)	Compare all the digital modulation techniques	[L2][CO4][6M]
	b)	Derive the probability of error for a coherent QPSK system	[L3] [CO4][6M]
2.	a)	Sketch with a neat diagram of M-array PSK transmitter and receiver	[L3] [CO4][6M]
	b)	What are the parameters you can consider to choose the modulation techniques	[L1] [CO4] [6M]
3.	a)	Draw the block diagram of ASK transmitter and receiver and explain the operation.	[L1] [CO4] [6M]
	b)	Derive an expression for probability of error in BFSK	[L3] [CO4] [6M]
4.	a)	Derive an expression for probability of error of coherent binary ASK?	[L3] [CO4] [6M]
	b)	What is Bandwidth of BPSK, BFSK?	[L1][CO4][6M]
5.	a)	Derive the expression for probability of error for BPSK.	[L3] [CO4] [6M]
	b)	How will you differentiate binary PSK and M-PSK, explain with block diagrams?	[L2] [CO4] [6M]
6.	a)	Illustrate the pass band transmission model with neat diagram?	[L3] [CO4] [6M]
	b)	Explain pass band transmission with band pass transmission	[L2] [CO4][6M]
7.	a)	Describe the generation and detection of DPSK	[L2][CO4][6M]
	b)	A binary data stream 101101100 is to be transmitted using DPSK. Determine the encoded and decoded output.	[L3][CO4][6M]
8.		Draw the block diagram of QPSK transmitter & receiver and explain each block in detail	[L1] [CO4] [12M]
9.	a)	Explain coherent digital modulation technique?	[L1] [CO4] [4M]
	b)	i) What is meant by DPSK?	[L1][CO4][2M]
		ii) What are all the significance of BPSK?	[L3][CO4][3M]
		iii) Distinguish between QPSK and BPSK?	[L4][CO4][3M]
10.	a)	Describe the generation and detection of BPSK	[L2][CO4][6M]
	b)	Discuss in brief about coherent detection of binary FSK	[L2][CO4][6M]

UNIT –V

Channel Coding

1. A generator matrix for a (6, 3) block code is given below

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

a) List all the code vectors. [L1][CO5][6M]
b) Find out minimum distance & weight of the code. [L3][CO5][3M]
c) How many errors can be detected &corrected? [L2][CO5][3M]

2. a) Explain the concept of matrix representation of Linear block codes. [L2][CO5][6M]
b) Describe the Error detection and correction codes. [L2][CO5][6M]

3. a) What are the types of parity check codes explain with neat diagrams? [L1][CO5][6M]
b) Explain the concept of Parity check matrix for linear block codes. [L2][CO5][6M]

4. The parity check matrix for a (7, 4) block code is given below

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

a) Find the generator matrix (G). [L3][CO5][6M]
b) List all the code vectors. [L1][CO5][6M]

5. a) What is forward error correction system and explain in detail? [L1][CO5][6M]
b) Describe the matrix representation of linear block codes? [L2][CO5][6M]

6. a) Draw and explain the block diagram of ARQ system in detail [L1][CO5][6M]
b) List out the various types of ARQ systems. [L1][CO5][6M]

7. The Generator matrix(G) for a (7, 4) block code is given below

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

a) Determine the Parity check matrix (G). [L3][CO5][6M]
b) Find code vectors for any eight messages. [L3][CO5][6M]

8. a) Explain the Convolutional Encoding and Decoding methods. [L2][CO5][6M]
b) Discuss in brief about sequential decoding of convolutional codes. [L2][CO5][6M]

9. For a systematic (7, 4) linear block code the sub matrix 'P' is given as [L5][CO5] [12M]

$$P=\begin{bmatrix}1 & 1 & 1\\ 1 & 1 & 0\\ 1 & 0 & 1\\ 0 & 1 & 1\end{bmatrix}$$

Detect & correct the error using syndrome vector for the given code vectors

$$Y_A = [0111110]\ Y_B = [1011100] C)\ Y_C = [1010000]$$

10 Define the following terms [L1][CO5] [12M]
i) Code efficiency ii) Hamming Distance
ii) Code vectors iv)Constraint length.