Course Code: 20EC0410 R20

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR (AUTONOMOUS)

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QUESTION BANK (DESCRIPTIVE)

Subject with Code:DC (20EC0410) **Course & Branch**: B. Tech& ECE

Year & Sem: II-B.Tech& II-Sem **Regulation:** R20

UNIT –I

Introduction &Source Coding Systems

1.	a)	Draw the block diagram of digital communication system? Explain each block?	[L2] [CO1]	[6M]
		A Television signal having a bandwidth of 4.2 MHz is transmitted using binary PCMsystem. Given that the number of quantization levels is 512. Determine	[L3] [CO4]	[6M]
		i) Codeword length? ii)Transmission Bandwidth?		
		iii) Final Bit rate? iv) Output SNR ratio?		
2.	a)	Explain fundamental limitations of Communication Systems	[L2] [CO1]	[6M]
	b)	Compare Analog and Digital Communication	[L2] [CO1]	[6M]
3.	a)	State sampling theorem.	[L1] [CO1]	[6M]
	b)	Consider an audio signal consisting of the sinusoidal term given as $x(t) = 3\cos(500\pi t)$	[L3] [CO5]	[6M]
		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?		
4.	a)	Explain the Process of Quantization through one Example?	[L2] [CO1]	[6M]
	b)	Discuss the different types of Quantization in Detail?	[L2] [CO1]	[6M]
5.	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]
6.		Discuss the Noise considerations in PCM systems?	[L2] [CO5]	[6M]
		Draw and explain the block diagram of regenerative repeaters?	[L2] [CO1]	[6M]
7.	a)	Derive the quantization noise in PCM?	[L3] [CO5]	[6M]
	b)	Derive the S/N ratio of PCM?	[L3] [CO5]	[6M]
8.	a)	Explain the DPCM system with neat diagram?	[L2] [CO1]	[8M]
	b)	What are the advantages & disadvantages of DPCM?	[L1] [CO1]	[4M]
9.		Explain the DM (delta modulation system) with suitable diagrams?	[L2] [CO1]	[8M]
		Explain Slope overload Distortion & Granular Noise?	[L2] [CO5]	[4M]
10.	a)	Compare PCM, DPCM, and DM?	[L2] [CO1]	[8M]
	b)	List the Advantages of DM	[L1] [CO1]	[4M]

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UNIT –II

BASEBAND PULSE TRANSMISSION

1.	a)	Explain the matched filter.	[L2] [CO6]	[6M]
	b)	Derive the properties of matched filter.	[L3] [CO6]	[6M]
2.	a)	Derive the expression for impulse response of a matched filter.	[L3] [CO6]	[6M]
	b)	Explain the rectangular pulse for a matched filter?	[L2] [CO6]	[6M]
3.		Explain in detail about Inter symbol interference and its effects?	[L2] [CO5]	[12M]
4.	a)	What is ISI? Draw the basic block diagram of baseband binary data transmission	[L1] [CO5]	[6M]
	b)	What are the remedies to reduce ISI.	[L1] [CO5]	[6M]
5.		Derive the expression for the Nyquist criterion for distortion less baseband Transmission inthe absence of noise in terms of time domain & Frequency domain.	[L3] [CO2]	[12M]
6.	a)	What are the effects of ISI?	[L1] [CO5]	[6M]
	b)	Describe Eye pattern and construct the diagram.	[L2] [CO2]	[6M]
7.		A polar NRZ waveform has to be received into the help of a matched filter. Here binary ‘1’ isrepresented 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] [CO6]	[12M]
8.		What is correlative coding? Explain in detail Duo binary signaling with one example.	[L2] [CO3]	[12M]
9.	a)	Explain in detail about modified duo binary signaling scheme?	[L2] [CO4]	[6M]
	b)	Describe the baseband M-array PAM Transmission system.	[L2] [CO2]	[6M]
10.		Explain duo-binary signaling scheme with precoder through one example.	[L2] [CO4]	[6M]

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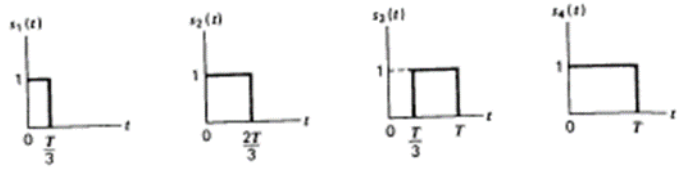
UNIT –III

Signal Space Analysis

1.		Explain the concept of geometrical representation of signals.	[L2] [CO4]	[12M]
2.	a)	Explain the Schwarz Inequality	[L2] [CO4]	[6M]
	b)	Determine signal representation of a signal N=2and M=3.	[L2] [CO4]	[6M]
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] [CO4]	[12M]
				
4.	a)	What is the orthogonal basis function?	[L1] [CO4]	[6M]
	b)	Explain the concept of orthogonality basis function.	[L2] [CO4]	[6M]
5.	a)	What is Gram-Schmidt orthogonalization procedure? Explain	[L1] [CO4]	[6M]
	b)	Discuss about signal constellation diagram.	[L2] [CO4]	[6M]
6.		Draw the block diagram of the structure and behavior of Matched filter Receiver?	[L1] [CO5]	[12M]
7.	a)	Draw the block diagram of a most basic form of digital communication system.	[L1] [CO1]	[6M]
	b)	Illustrate optimum receiver for AWGN channel?	[L2] [CO5]	[6M]
8.	a)	a) Sketch the signal constellation diagrams for N=M=2	[L3] [CO4]	[6M]
	b)	b) Explain the geometrical representation of signals.	[L2] [CO4]	[6M]
9.		Explain the following	[L2] [CO4]	[12M]
		i) Additive White Gaussian noise? ii) Orthogonality?		
		iii) Signal vector? iv) Synthesizer?		
10.	a)	Explain the concept of AWGN channel.	[L2] [CO5]	[6M]
	b)	With a neat sketch explain the working of correlation receiver.	[L2] [CO6]	[6M]

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UNIT –IV

Passband Data Transmission

1.	a)	Illustrate the pass band transmission model with neat diagram?	[L3] [CO2]	[6M]
	b)	Explain pass band transmission with band pass transmission	[L2] [CO2]	[6M]
2.	a)	Draw the block diagram of ASK transmitter and receiver and explain the operation.	[L1] [CO3]	[6M]
	b)	Derive an expression for probability of error of coherent binary ASK?	[L3] [CO5]	[6M]
3.	a)	Derive an expression for probability of error in BFSK	[L3] [CO5]	[6M]
	b)	What is Bandwidth of BPSK, BFSK?	[L1][CO2]	[6M]
4.	a)	Derive the expression for probability of error for BPSK.	[L3] [CO5]	[6M]
	b)	How will you differentiate binary PSK and M-PSK, explain with block diagrams?	[L2] [CO3]	[6M]
5.	a)	Describe the generation and detection of BPSK	[L2][CO4]	[6M]
	b)	Discuss in brief about coherent detection of binary FSK	[L2][CO4]	[6M]
6.	a)	Describe the generation and detection of DPSK	[L2][CO4]	[6M]
	b)	A binary data stream 101101100 is to be transmitted using DPSK.	[L4][CO4]	[6M]
7.	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]
		Determine the encoded and decoded output.		
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)	Compare all the digital modulation techniques	[L2][CO3]	[6M]
	b)	Derive the probability of error for a coherent QPSK system	[L3] [CO5]	[6M]

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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][CO4]	[6M]
	b)	Find out minimum distance & weight of the code.	[L3][CO4]	[3M]
	c)	How many errors can be detected &corrected?	[L2][CO4]	[3M]
2.	a)	Explain the concept of matrix representation of Linear block codes.	[L2][CO4]	[6M]
	b)	Describe the Error detection and correction codes.	[L2][CO4]	[6M]
3.	a)	What are the types of parity check codes explain with neat diagrams?	[L1][CO3]	[6M]
	b)	Explain the concept of Parity check matrix for linear block codes.	[L2][CO3]	[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][CO3]	[6M]
	b)	List all the code vectors.	[L1][CO3]	[6M]
5.	a)	What is forward error correction system and explain in detail?	[L1][CO4]	[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][CO3]	[6M]
	b)	Find code vectors for any eight messages.	[L3][CO3]	[6M]
8.	a)	Explain the Convolutional Encoding and Decoding methods.	[L2][CO3]	[6M]
	b)	Discuss in brief about sequential decoding of convolutional codes.	[L2][CO3]	[6M]
9.		For a systematic (7, 4) linear block code the sub matrix ‘P’ is given as	[L5][CO3]	[12M]
		$\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$		

		P=		
		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 i) Code efficiency ii) Hamming Distance ii) Code vectors iv)Constraint length.	[L1][CO5]	[12M]

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