Course Code: 23EC5T07

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

III - B.Tech I-Semester Regular Examinations (BR23), Nov/Dec - 2025

DIGITAL COMMUNICATIONS (ECE)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B
*Answer **ALL** the question in **Part-A andPart-B***

PART–A (10X2 = 20M)

		Marks	CO	BL
1. a)	Write the advantages of digital communication over analog communication	(2M)	CO 1	2
b)	Classify the different types of noise in DM system	(2M)	CO 1	2
c)	Demonstrate 100111010 using Bipolar NRZ data format	(2M)	CO 2	2
d)	What are the advantages of DPSK	(2M)	CO 2	1
e)	Class the difference between band pass and base band transmission	(2M)	CO 3	2
f)	What is optimum filter	(2M)	CO 3	1
g)	Define codeword	(2M)	CO 4	1
h)	How the representation of Generator matrix. Give one example	(2M)	CO 4	1
i)	What are convolution codes	(2M)	CO 5	1
j)	What is code tree	(2M)	CO 5	1

PART–B (5X10 = 50M)

2a.	Explain quantization error and derive an expression for maximum SNR in PCM system	05(M)	**C312. 1**	BL2
b	Explain the working of Adaptive Delta Modulation with necessary circuit diagrams	05(M)	**C312. 1**	BL2
	(OR)			
3a.	Select an analog signal is to be transmitted over a PCM system with an accuracy of ± 0.1 %.The analog voltage waveform has bandwidth of 100Hz and amplitude range of -10V to +10V i) Find minimum sampling rate is required ii) Find the number of bits in each PCM iii) Find minimum bit rate required in PCM system iv) Find minimum absolute channel bandwidth required for the transmission of PCM signal	05(M)	**C312. 1**	BL3
b.	Explain the working of DPCM transmitter and receiver with neat circuit diagram	05(M)	**C312. 1**	BL3

4	Draw the block diagram of QPSK transmitter and coherent QPSK receiver and explain their operation	10(M)	**C312. 2**	BL2
	(OR)			
5a.	Explain the generation of binary PSK signal	05(M)	**C312. 2**	BL2
b.	Compare ASK, FSK & PSK	05(M)	**C312. 2**	BL2

6a.	Find the probability of error using Optimum filter	05(M)	**C312.3**	BL1
b.	With neat sketch explain about baseband signal receiver	05(M)	**C312.3**	BL2
	(OR)			
7a.	Illustrate the properties of matched filter	05(M)	**C312.3**	BL2
b.	Explain probability of error for coherently detected BPSK	05(M)	**C312.3**	BL2

8a.	The generator matrix for a (6,3) block codes is shown bellow. Identify all code words of this code $G = \begin{bmatrix} 1 & 0 & 0:0 & 1 & 1 \\ 0 & 1 & 0:1 & 0 & 1 \\ 0 & 0 & 1:1 & 1 & 0 \end{bmatrix}$	05(M)	**C312.4**	BL3
b.	Define linear block code and examine its properties	05(M)	**C312.4**	BL3
	(OR)			
9a.	The parity check matrix of a(7,4) hamming code is expressed as under $H = \begin{bmatrix} 1 & 1 & 1\,0:1 & 0 & 0 \\ 1 & 1 & 0\,1:0 & 1 & 0 \\ 1 & 0 & 1\,1:0 & 0 & 1 \end{bmatrix}$ Identify the syndrome vector for single bit error	05(M)	**C312.4**	BL3
b.	The generator polynomial of a (7,4) cyclic code is $G(P) = P^3+P+1$ .Inspect all code vectors for the code in non systematic form	05(M)	**C312.4**	BL4

10a.	With an example ,Outline the decoding using Viterbi algorithm	05(M)	**C312.5**	BL2
b.	Explain encoding of convolution codes using transform domain approach	05(M)	**C312.5**	BL2
	(OR)			
11a.	Explain tree diagram, trellis diagram and state transition diagram of convolutional codes	05(M)	**C312.5**	BL2
b.	List the advantages ,disadvantages and applications of convolutional codes	05(M)	**C312.5**	BL2

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