Course Code: 23EC5T07

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

III - B. Tech I-Semester Supplementary Examinations (BR23), Mar/Apr - 2026

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)	List any two advantages of digital communication systems.	(2M)	CO1	2
b)	Define companding and mention its purpose in PCM.	(2M)	CO1	2
c)	What is DPSK? Write any two advantages.	(2M)	CO2	2
d)	Write the expression of a BFSK signal.	(2M)	CO2	2
e)	Define probability of error.	(2M)	CO3	2
f)	What is a matched filter?	(2M)	CO3	1
g)	Define Hamming distance.	(2M)	CO4	1
h)	What is a generator matrix? Give an example.	(2M)	CO4	1
i)	Define convolutional code.	(2M)	CO5	1
j)	What is a trellis diagram?	(2M)	CO5	1

PART–B (5X10 = 50M)

2a.	Explain sampling, quantization and coding in PCM with neat block diagram.	5 (M)	CO1	**BL2**
b.	Discuss the drawbacks of delta modulation and explain ADM with block diagram.	5(M)		
	(OR)			
3a.	An analog signal of bandwidth 3 kHz is transmitted using PCM with a signal-to-quantization noise ratio of 45 dB. Determine: i) Number of quantization levels ii) Number of bits/sample iii) Minimum sampling rate iv) Bit rate	(5M)	CO1	*BL3*
b.	Compare PCM, DPCM and DM systems.	5(M)		
4	Draw and explain the transmitter and receiver of QPSK with constellation diagram.	10(M)	CO2	**BL2**
	(OR)			
5a.	Explain the generation of BPSK signal.	(5M)	CO2	**BL2**
b.	Compare ASK, FSK and PSK in terms of bandwidth, power and noise performance.	(5M)		

6a.	Explain baseband signal receiver with neat block diagram.	(5M)	CO3	BL3
b.	Derive the expression for probability of error using matched filter.	5(M)		
	(OR)			
7a.	Explain coherent detection of BFSK.	5(M)	CO3	BL2
b.	Derive probability of error for BPSK.	5(M)		
8a.	Explain error detection and correction capability of linear block codes.	5(M)	CO4	BL3
b.	Construct all codewords of a (7,4) Hamming code.	5(M)		
	(OR)			
9a.	Explain syndrome calculation in cyclic codes.	5(M)	CO4	BL3
b.	Explain encoding of BCH codes.	5(M)		
10a	Explain Viterbi algorithm with an example trellis.	5(M)	CO5	BL2
b.	Explain time domain approach for convolutional code encoding.	5(M)		
	(OR)			
11a	Draw state, tree and trellis diagrams for a rate 1/2 convolutional code.	5(M)	CO5	BL2
b.	Write advantages, disadvantages and applications of convolution codes.	5(M)		

****