R20 Regulation *Subject code:3O7EB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VII Semester Supplementary Examinations, October 2026

INFORMATION THEORY AND CODING

(CSE)

Maximum Marks: 70 Date: 02.11.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Justify the Statement 'Information measure is inversely proportional to logarithmic Probability'.	2M	1	L1
2	Define Channel Capacity.	2M	1	L1
3	State Shannon's noiseless coding theorem.	2M	2	L1
4	Define Code efficiency and Code Redundancy.	2M	2	L1
5	What is Systematic Codes?	2M	3	L1
6	Define Linear Block Codes.	2M	3	L1
7	Write the Linearity Property of Cyclic Codes.	2M	4	L1
8	Mention the advantages of Cyclic Codes.	2M	4	L1
9	What are convolutional codes? How are they different from block codes?	2M	5	L1
10	Draw the state diagram of Convolutional encoder.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Explain in detail about discrete memory less channel with channel matrix.	10M	1	L2
	OR			
12	State and Prove any two properties of Mutual Information.	10M	1	L2
13	Explain Huffman Coding algorithm in detail with an example.	10M	2	L2
	OR			
14	a) Explain Source coding theorem. b) Explain Shannon's noisy and noiseless theorems.	5M 5M	2	L2
15	For a systematic (6,3) Linear block code, the parity matrix $[P] = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ .Find all the code vectors of this code.	10M	3	L2
	OR			
16	a) Give the matrix description for linear block codes. b) Derive the steps involved in generation of linear block codes.	5M 5M	3	L2

17	Explain the encoding and decoding methods for cyclic codes giving proper block diagram.	10M	4	L2
	OR			
18	Explain how generator and parity check matrices are obtained for Cyclic Codes.	10M	4	L2
19	Explain the Viterbi algorithm and sequential decoding of Convolutional Codes.	10M	5	L2
	OR			
20	Explain Development of Code tree in Convolution encoder.	10M	5	L2