R20 Regulation *Subject code:3O7EB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VII Semester Supplementary Examinations, May 2026

INFORMATION THEORY AND CODING

(CSE)

Maximum Marks: 70 Date: 14.05.2026 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 Redundancy.	2M	2	L1
5	State the principle of Block Coding.	2M	3	L1
6	What are Nonsystematic Codes?	2M	3	L1
7	Write the Linearity Property of Cyclic Codes.	2M	4	L1
8	Write Algebraic Structure of Cyclic Codes.	2M	4	L1
9	What is constraint length for convolutional encoders?	2M	5	L1
10	Write the advantages and disadvantages of convolutional codes.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	A Source emits one of the four probable messages m1, m2, m3, m4 with probabilities 4/11,3/11,2/11,2/11. a) Find the entropy of the source. b) List all the elements for the 2nd extension of the source. c) Hence show that $H(S^2) = 2H(S)$.	10M	1	L2
	OR			
12	Explain Mutual Information, State and Prove properties of mutual information	10M	1	L2
13	Apply Shannon-Fano coding procedure of M=2 and M=3 [x]=[x1, x2, x3, x4, x5, x6,x7,x8] with probability [P]=[1/4,1/8,1/16,1/16,1/4,1/16,1/8,1/16].	10M	2	L2
	OR			
14	Explain Shannon's noisy and noiseless theorems.	10M	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	Explain about the Error detection and Error Correction capabilities of linear block codes with an example.	10M	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 time domain and transform domain approach to analysis of Convolutional encoder.	10M	5	L2
	OR			
20	Explain Development of Code tree in Convolution encoder.	10M	5	L2