



Regulation R20

Subject code: 307EB

**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**

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

**B.Tech IV Year I Semester Supplementary Examinations, December 2024**

**INFORMATION THEORY AND CODING**

(CSE)

Maximum Marks: 70

Date:04.01.2025

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 10 questions. Answer any 5 questions which carries 10M.
  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=20Marks)		Blooms Taxonomy
1	Define Entropy.	L1
2	What is Information Rate?	L1
3	State Source Coding theorem.?	L1
4	Define Code Redundancy.	L1
5	State the principle of Block Coding?	L1
6	What are Nonsystematic Codes?	L1
7	Write Advantages of Cyclic Codes?	L1
8	Write the Cyclic Property of Cyclic Codes?..	L1
9	What are convolutional codes? How are they different from block codes?	L1
10	Compare Linear Block Codes and Convolutional Codes	L1

**Part-B**

Answer any five questions (10MX 5=50Marks)		
11	Explain in detail about discrete memory less channel with channel matrix? [10M]	L2
OR		
12	State and Prove any two properties of Mutual Information [10M]	L5
13	Apply Shannon-Fano coding procedure of M=2 and M=3 $[x]=[x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8]$ with probability $[P]=[1/4, 1/8, 1/16, 1/16, 1/4, 1/16, 1/8, 1/16]$ . [10M]	L2
OR		
14	a) Explain Source coding theorem. [5M] b) Explain Shannon's noisy and noiseless theorems [5M]	L4
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]	L4
OR		

16	a)Give the matrix description for linear block codes. b)Derive the steps involved in generation of linear block codes	[5M] [5M]	L2
17	Explain the encoding and decoding methods for cyclic codes giving proper block diagram?	[10M]	L2
	OR		
18	Explain how generator and parity check matrices are obtained for Cyclic Codes	[10M].	L4
19	Explain the Viterbi algorithm and sequential decoding of Convolutional Codes	[10M]	L3
	OR		
20	Explain Development of Code tree in Convolution encoder	[10M]	L2