



R20 Regulation

Subject code:307EB

**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**

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

**B.Tech VII Semester Supplementary Examinations, November 2025**

**INFORMATION THEORY AND CODING**

(CSE)

Maximum Marks: 70

Date: 01.12.2025

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 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	Define Entropy?	2M	1	L1
2	What is Information Rate?	2M	1	L1
3	State Source 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 Advantages of Cyclic Codes?	2M	4	L1
8	Write the Cyclic Property of Cyclic Codes?..	2M	4	L1
9	What is constraint length for convolutional encoders?.	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	A (7,4) linear block code is generated according to the following Parity Check Matrix H. The received code word 'Y' is [1 0 0 0 1 1] for a transmitted code word 'X'. Find the corresponding data transmitted.	10M	3	L2
$H = \begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$				
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	Find out the Generator matrix for a systematic (7,4) cyclic code if $G(p) = p^3 + p + 1$ . Also find out the parity check matrix.	10M	4	L2
19	a) Explain Time domain approach to analysis of Convolutional encoder b) Explain Transform domain approach to analysis of Convolutional encoder	5M 5M	5	L2
OR				
20	Explain Development of Code tree in Convolution encoder	10M	5	L2