



R20 Regulation

Subject code: 307EB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VII Semester Supplementary Examinations, April 2024

INFORMATION THEORY & CODING (CSE)

Maximum Marks: 70

Date: 27.04.2024 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 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=20 Marks)

- 1 Define Entropy.
- 2 What is Information Rate?
- 3 State Source Coding theorem.
- 4 Define Code Redundancy.
- 5 State the principle of Block Coding.
- 6 What are Nonsystematic Codes?
- 7 Write the Linearity Property of Cyclic Codes?
- 8 Write Algebraic Structure of Cyclic Codes?
- 9 What is constraint length for convolutional encoders?
- 10 Draw the state diagram of Convolutional encoder

Part-B

Answer All the following questions

(5X10M=50Marks)

- 11 A. Derive the expression for Entropy H. [5M]
B. Prove that $H(S^n) = n \cdot H(s)$ [5M]
OR
- 12 Explain Mutual Information, State and Prove properties of mutual information. [10M]
- 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]
OR
- 14 Explain Huffman Coding algorithm for
 - i) Binary Coding
 - ii) Ternary codingA. Quaternary coding [10M]
- 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]

OR

- 16 A. Give the matrix description for linear block codes. [5M]
B. Derive the steps involved in generation of linear block codes [5M]
- 17 Explain error correction using syndrome vector assuming the transmitted code vector as $X=(1\ 0\ 0\ 1\ 1\ 1\ 0)$ [10M]
- OR
- 18 Explain syndrome decoder for (n, k) block code with block diagram? [10M]
- 19 Explain Time domain and Transform domain approach to analysis of Convolutional encoder [10M]
- OR
- 20 Explain in detail any one decoding method of Convolutional codes. [10M]