



R20 Regulation

Subject code:3P5DC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, December 2024

DIGITAL COMMUNICATIONS (ECE)

Maximum Marks: 70

Date:31.12.2024

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)		CO	Bloom Tx
1	Define sampling theorem.	1	L1
2	What are the drawbacks of delta modulation?	1	L1
3	Draw the ASK signal for 10110011.	2	L1
4	What are the Drawbacks of ASK over PSK?	2	L1
5	Define information rate (R).	3	L1
6	State Shannon's Hartley theorem.	3	L1
7	Write the advantages of convolution codes.	4	L1
8	Define Hamming Distance?	4	L1
9	What is spread spectrum modulation?	5	L1
10	Expand DSSS.	5	L1

Part-B

Answer All the following questions.						(5X10M=50Marks)	CO	Bloom Tx
11	A) Write the advantages of digital communication over analog communication. [5M]						1	L2
	B) What are the Applications of Digital Communications? [5M]							
	OR							
12	Derive an expression for signal to quantization noise power ratio for Delta Modulation [DM]. Assume that no slope overload exists. [10M]						1	L2
13	Explain the modulation and demodulation of PSK technique with neat sketch? [10M]						2	L2
	OR							
14	Describe the modulation and non-coherent detection of BFSK with the help of a neat diagram. [10M]						2	L2
15	An information source produces a sequence of independent symbols having the following probabilities [10M]						3	L2
	symbol	S1	S2	S3	S4	S5		
	probability	0.4	0.2	0.1	0.2	0.1		
	Construct binary code using Huffman encoding procedure and find its efficiency							

	OR		
16	Apply Shannon fano coding procedure for a discrete memory less source 'X' with six symbols X ₁ , X ₂ , X ₃ , X ₄ , X ₅ , X ₆ find a compact code for every symbol if the probability distribution is as follows: X ₁ = 0.3, X ₂ =0.25, X ₃ = 0.2, X ₄ = 0.12, X ₅ = 0.08, X ₆ =0.05. Calculate entropy of the source, average length of the code, efficiency and redundancy of the code. [10M]	3	L2
17	Consider the (6, 3) linear block code with $G = \begin{bmatrix} 1 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{bmatrix}$ i) write the Parity equations ii) If the received code word is 010111, determine syndrome and location of the error. [10M]	4	L2
	OR		
18	Consider a (7,4) linear block code whose generator matrix is given G = $\begin{bmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 1 \end{bmatrix}$ M = [1 1 0 0] a) Find all the code vectors of the code. b) Find the parity check matrix of this code. c) Find minimum weight of this code. [10M]	4	L2
19	Explain with a neat sketch, the Direct Sequence Spread Spectrum [DSSS] Modulation. [10M]	5	L2
	OR		
20	Explain the Frequency hopping spread spectrum [FHSS] modulation? [10M]	5	L2