R18 Regulation *Subject code: 2P5DD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, April 2026

DIGITAL COMMUNICATIONS

(ECE)

Maximum Marks: 70 Date: 22.04.2026 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	Define Aliasing and write the condition for it.	2M	1	L1
2	What is Nyquist rate and Nyquist interval?	2M	1	L1
3	What is Amplitude Shift Keying?	2M	2	L1
4	What is Frequency Shift Keying?	2M	2	L1
5	Define entropy and give the expression for it.	2M	3	L1
6	List any two properties of Information?	2M	3	L1
7	Define Hamming distance and calculate its value for two code words 11001 and 10100.	2M	4	L1
8	Define Hamming Weight and Calculate hamming weight for two code words 101100 and 110000.	2M	4	L1
9	What is frequency hopping Spread Spectrum?	2M	5	L1
10	What are the applications of spread spectrum modulation?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	State and prove the sampling theorem in time domain.	10M	1	L2
	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	Explain non coherent detection method of binary frequency shift keying [FSK]scheme.	10M	2	L2
15	Prove that the capacity of a white band limited Gaussian channel is B $\log_2(1+S/N)$ bits/sec.	10M	3	L2
	OR			
16	Apply Shannon fano coding procedure for a discrete memory less source 'X' with six symbols X1, X2, X3, X4, X5, X6 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	The generator matrix for a (6, 3) block code is given by $G = \begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{bmatrix}$ a) Find the code vectors. b) Find the parity check matrix. c) Find the error syndrome.	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 the role of CDMA in present generation.	10M	5	L2
	OR			
20	Explain the advantages and applications of spread spectrum modulation.	10M	5	L2