



**R18 Regulation**

**Subject code:2P5DD**

**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**

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

**B.Tech V Semester Supplementary Examinations, May 2025**

**DIGITAL COMMUNICATIONS**

**(ECE)**

**Maximum Marks: 70**

**Date: 24.06.2025**

**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 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	Write the formula for code efficiency?	2M	4	L1
8	Define Hamming Weight and Calculate hamming weight for two code words 101100 and 110000.	2M	4	L1
9	Write various types of SS systems.	2M	5	L1
10	List out the properties of PN sequence.	2M	5	L1

**Part-B**

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	With a neat block diagram, explain the elements of digital communication system.	10M	1	L2
OR				
12	Prove that the signal to quantization noise power ratio in Pulse Code Modulation [PCM] system is $(4.8+6v)$ dB.	10M	1	L2
13	Explain the modulation and demodulation of ASK technique with neat sketch.	10M	2	L2
OR				
14	Explain the Receiver of 8-PSK technique with neat sketch.	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 to find the coding efficiency for the following message ensemble. $X_1= \frac{1}{4}$ , $X_2= \frac{1}{8}$ , $X_3= \frac{1}{16}$ , $X_4= \frac{1}{16}$ , $X_5= \frac{1}{16}$ , $X_6= \frac{1}{4}$ , $X_7= \frac{1}{16}$ , $X_8= \frac{1}{8}$ .	10M	3	L2

17	<p>The generator matrix for a (6, 3) block code is given by</p> $G = \begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{bmatrix}$ <p>a) Find the code vectors.  b) Find the parity check matrix.  c) Find the error syndrome</p>	10M	4	L2
OR				
18	<p>Consider a (7,4) linear block code whose generator matrix is given <math>G =</math></p> $\begin{bmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 1 \end{bmatrix}$ <p><math>M = [1 \ 1 \ 0 \ 0]</math></p> <p>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.</p>	10M	4	L2
19	<p>Explain about PN [ Pseudo-Noise] sequence generation.</p>	10M	5	L2
OR				
20	<p>Explain Direct Sequence Spread Spectrum [ DS-SS] with a neat sketch.</p>	10M	5	L2