*R18 Regulation* *Subject code: 2P5DD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

## B.TechV Semester Supplementary Examinations, July 2022
## DIGITAL COMMUNICATIONS
*(ECE)*

***Maximum Marks: 70*** Date:06.07.2022 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)

1 Distinguish between natural sampling and flat top sampling
2 Explain the need for non-uniform quantization in digital communication.
3 Sketch the wave form of the QPSK signal for the input binary sequence 11001010101.
4 Sketch the block diagram of BPSK generation.
5 Define Self and Mutual Information.
6 Derive the Expression for the Information Rate.
7 Explain in one sentence about (i) Block Size (ii) Linear block codes.
8 Define code rate of block code.
9 Explain the generation of PN sequence.
10 What is Frequency hopping spread spectrum?

Part-B

Answer All the following questions. (10M X 5=50Marks)

11 Explain about the noise in PCM systems. [10]

OR

12 a) A voice frequency signal band limited to 3kHz is transmitted with the use of the DM system. The pulse repetition frequency is 30,000 pulses per second, and the step size is 40mV. Determine the permissible speech signal amplitude to avoid slope overload. [5]
b) Derive the expression for overall SNR in a ADM system. [5]

13 a) How the generation of DPSK signals shall be done? [5]
b) Explain the working principles of QPSK modulation and demodulation. [5]

OR

14 Explain about ASK system and derive the expression for error probability of binary ASK. [10]

15 a) What is Entropy? list its properties. [5]
b) Explain Syndrome decoding. [5]

OR

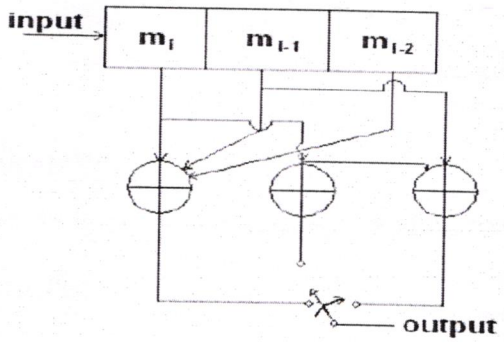
16 a) State Shannon's source coding theorem and explain its implications. [5]

b) A DMS has symbols a,b,c with probabilities 0.65, 0.2, 0.15 respectively. [5]
i) Calculate the entropy of the source
ii) Calculate the entropy of second order extension of the source.

17 a) Give the matrix description for linear block codes. [5]
b) Decode convolution process using viterbi algorithm. [5]

OR

18 a)For the convolutional encoder shown below, draw the state diagram and the trellis diagram. [5]




b) What is Convolutional Code? Compare error rates in coded and uncoded transmission. [5]

19 a) Explain about PN-Sequences generation and their characteristics. [5]
b) What is meant by Synchronization? Why we require synchronization in spread spectrum? Explain in detail. [5]

OR

20 Explain the role of code division multiple access technique in present generation? [10]