Regulation R17 *Subject code: 1P5DC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech III Year I Semester Supplementary Examinations, July 2022
DIGITAL COMMUNICATIONS
(ECE)

Maximum Marks: 70 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 What are the advantages of digital communication systems?
2 What is meant by Quantization?
3 Draw the ASK and FSK waveforms for 011011.
4 Find the band width required for frequency shift keying and draw its spectrum.
5 State the properties of Entropy.
6 Define information. Show that information contained by a symbol is inversely proportional to the probability of that symbol.
7 List the features of binary cyclic codes.
8 What is a Hamming distance?
9 What is spread spectrum?
10 What are the advantages of Code division multiple access?

Part-B

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

11. State and prove sampling theorem in time domain. 10

OR

12.a Explain with neat block diagram adaptive delta modulator transmitter and receiver? 6

b Explain the advantages of Adaptive delta modulation? 4

13 Draw the block diagram of DPSK modulator and explain how synchronization problem is avoided for its detection. 10

OR

14 Explain the modulation of FSK and demodulation of FSK using coherent detection. 10

15.a State and prove the condition for entropy to be maximum. 5

b Prove that $H(Y/X) \leq H(Y)$ with equality if and only if X and Y are independent. 5

OR

16. A discrete source emits one of five symbols once every millisecond. The symbol probabilities are ½, ¼, 1/8, 1/16, 1/16 repectively. Find the source entropy and

information rate.

OR

17 Consider the (8,4) linear block code with
G= 1 0 0 0 1 1 1 1
0 1 0 0 1 1 1 1
0 0 1 0 0 0 1 1
0 0 0 1 0 1 0 1 10

(a) Construct all the possible code words
(b) Construct all the single error patterns.

OR

18 Consider a (7,4) linear code whose generator matrix is
G= 1 0 0 0 1 0 1
0 1 0 0 1 1 1
0 0 1 0 1 1 1
0 0 0 1 0 1 1 10

(a) Find all the code vectors of this code.
(b) Find the parity check matrix for this code.
(c) Find the minimum weight of this code.
(d) Show the error correction capability of this code,

19 Explain how PN sequences are generated. What are maximal-length sequences? What are their properties and why are they preferred? 10

OR

20 What are the two basic types of spread-spectrums systems? Explain the basic principle of each of them. 10