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Regulation R18 *Subject code: 2P5DD*

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

B.Tech IV 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 Define Aliasing and write the condition for it?
2 What is Nyquist rate and Nyquist interval?
3 What is Amplitude Shift Keying?
4 Draw the constellation diagram for 8-PSK.
5 Define Information Theory?
6 State the channel coding theorem.
7 Write the advantages of convolution codes.
8 Define Minimum Distance?
9 What is spread spectrum modulation?
10 Write the principle of CDMA?

Part-B

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

11 With a neat block diagram, explain the elements of digital communication system 10

OR

12 Prove that the signal to quantization noise power ratio in Pulse Code Modulation [PCM] system is (4.8+6v) dB. 10

13 Explain the modulation and demodulation of ASK technique with neat sketch? 10

OR

14 With a neat block diagram explain the detection of FSK using PLL 10

15 An information source produces a sequence of independent symbols having the following probabilities 10

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 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 10

17 The generator matrix for a (6, 3) block code is given by 10

$$G = \begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{bmatrix}$$

a) Find the code vectors.
b) Find the parity check matrix.
c) Find the error syndrome.

OR

18 The parity check matrix of a particular (6, 3) linear block code is 10

$$H = \begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$$

a) Find generator matrix.
b) List all the code vectors.
c) Minimum distance of the code vector.
d)How many errors can be detected and how many errors corrected

19 a) Define spread spectrum modulation. 5

b) Explain the advantages and applications of spread spectrum modulation 5

OR

20 Explain about PN [Pseudo-Noise] sequence generation? 10