Code: EC6T4

III B.Tech-II Semester–Regular/Supplementary Examinations–March 2018

DIGITAL COMMUNICATIONS
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours   Max. Marks: 70

PART – A

Answer *all* the questions.   All questions carry equal marks

11x 2 = 22 M

1. a) Compare the performance of DM with ADM.
   b) A telephone signal with cutoff frequency of 4kHz is digitized into 8 bit PCM sampled at Nyquist Rate. Calculate baseband Transmission bandwidth and signal to quantization noise ratio.
   c) Explain the similarity of BFSK and BPSK.
   d) Define Matched Filter and state its properties.
   e) Define spread spectrum Modulation and state its applications.
   f) Explain about Antijam characteristics of DS Spread spectrum systems.
   g) Define Entropy and list out its properties.
   h) Consider a telegraph source having two symbols, dot and dash. The dot duration is 0.2.The dash duration is 3 times the dot duration. The probability of the dot's occurring is twice that of the dash and the time between symbols is 0.2 sec. Calculate the information rate of the telegraphic source.

i) List the advantages and disadvantages of convolutional codes.

j) Write short notes on features of cyclic codes.

k) Compare DS-SS and FH-SS methods.

PART – B

Answer any *THREE* questions. All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2. a) With the help a neat diagram, explain the transmitter and receiver of PCM. 8 M

   b) What are the drawbacks of DM? Explain in detail, how can you overcome by using ADM. 8 M

3. a) Explain Gram Schmidit Orthogonalizaton Procedure. 8 M

   b) Find the average probability of error of BPSK and explain its operation. 8 M

4. a) Explain performance of Direct Sequence Spread Spectrum System. 8 M

   b) Compare Slow Frequency hopping and Fast Frequency hopping methods. 8 M

5. a) What is the difference between source coding and channel coding? What are the advantages of source coding? 8 M

b) Apply Shanon-Fano coding Procedure for the following
message ensemble: 8 M

$[X] = [x_1 \quad x_2 \quad x_3 \quad x_4 \quad x_5 \quad x_6 \quad x_7 \quad x_8]$

$[P] = [1/4 \quad 1/8 \quad 1/16 \quad 1/16 \quad 1/16 \quad 1/4 \quad 1/16 \quad 1/8]$

Take M=2.

6. a) The Parity Check matrix of a particular (7,4) linear block
code is given by,

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

(i)   Find the generator matrix (G).   2 M

(ii) List all the code vectors   2 M

(iii) What is the minimum distance between the code
      vectors ?   2 M

(iv) How many errors can be detected ? How many Errors
      can be corrected?   2 M

b) Describe the algebraic structure of the binary cyclic codes.

8 M