PVP 14

Code: EC6T4

III B.Tech-II Semester–Regular/Supplementary Examinations
March 2020

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) What is the bit transmission rate of a PCM system if the number of quantization levels is sixteen and the maximum signal frequency is 4 kHz.
b) Draw the block diagram of DPCM and explain.
c) Draw the unipolar, polar, bipolar, and Manchester waveform for the message 10110100.
d) What is the probability of error of FSK system?
e) Sketch the diagram of discrete memory less channel.
f) Discuss about the different noise effects in Delta Modulation.
g) Define Shannon's theorem.
h) List any two properties of matched filter.
i) What are the advantages of convolutional codes compared to linear block codes?
j) What is the significance of survivor paths in convolution codes?
k) What are the decoding methods used for convolutional codes? Compare them.

PART – B

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

3 x 16 = 48 M

2. a) Explain the working of DPCM transmitter and receiver with necessary block diagrams. 8 M

   b) Explain in detail about Duo binary signaling. 8 M

3. a) Explain the Gram Schmidt Orthogonalization procedure. 8 M

   b) Derive the expression for bit error probability of a coherent BFSK system. 8 M

4. a) Explain in detail slow hopping spread spectrum technique. 8 M

   b) A DSSS system transmits at a rate of 1000 bits/sec in the presence of a tone jammer. The average jammer power is 20 dB greater than the average desired signal power. Find the required E_b/J_o to achieve satisfactory performance is 10 dB. 8 M

5. a) State and prove the properties of mutual information. 8 M

   b) In a discrete memoryless source X with four symbols x1, x2, x3 and x4 with corresponding probabilities P(x1) = 0.5, P(x2) = 0.25, P(x3) = 0.125 and P(x4)=0.125. Calculate the efficiency using Shannon-fano code. 8 M

6. a) Draw the block diagram of the syndrome calculator for an (n, k) cyclic code and explain its working. 8 M

b) Assume a (2, 1) convolutional coder with constraint length 6. Draw the tree diagram and trellis diagram for the assumed coder. 8 M