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14ECS14

**First Semester M.Tech. Degree Examination, June/July 2018**  
**Advanced Digital Communication**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1 a. Explain in brief with a neat diagram of BPSK transmitter and receiver along with the constellation diagram's and probability of error. (10 Marks)
- b. Explain M-ary QAM scheme and find the probability of error. (10 Marks)
- 2 a. Evaluate the probability of error for QPSK system. (10 Marks)
- b. Explain the DPSK modulation scheme with a neat block diagram of transmitter and receiver. (10 Marks)
- 3 a. Explain about optimum decoding of convolutional code using Viterbi algorithm. (08 Marks)
- b. A rate  $\frac{1}{3}$   $K=3$  convolution encodes is shown in Fig. Q3 (b).

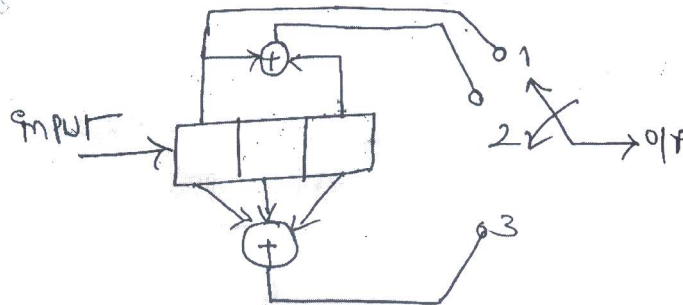


Fig. Q3 (b)

Find tree diagram, the Trellis diagram and state diagram.

(12 Marks)

- 4 a. Discuss the discrete time model for a channel with ISI. (08 Marks)
- b. Explain mean-square error criterion. (04 Marks)
- c. Explain about decision feedback equalization. (08 Marks)
- 5 a. Explain with neat diagram an adaptive equalization of Trellis coded signals. (10 Marks)
- b. Describe the RLS algorithm for performing the optimization in an adaptive equalizer. (10 Marks)
- 6 a. With a neat diagram, explain about frequency spread spectrum signals. (08 Marks)
- b. With a neat block diagram, explain about time hopping spread spectrum system. (06 Marks)
- c. The direct sequence spread spectrum communication system has the following parameters  
 data sequence bit duration,  $T_b = 4.095$  ms.  
 PN chip duration  $T_C = 1$  mS,  
 $E_b / N_0 = 10$  for average probability error less than  $10^{-5}$ .  
 (i) Calculate processing gain. (ii) Calculate Jamming margin. (06 Marks)
- 7 a. Explain about the characterization of fading multipath channels. (10 Marks)
- b. Explain in brief with a neat diagram of binary digital communication with system diversity. (10 Marks)
- 8 Write a short notes on:
  - a. Bandwidth efficiency of M-ary FSK signals.
  - b. Delay-locked loop (DLL) for PN code tracking.
  - c. Path memory and synchronization.
  - d. Multiple Antenna systems. (20 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.