Code: EC7T5C

IV B.Tech - I Semester – Regular Examinations - November 2015

ADVANCED CODING THEORY TECHNIQUES
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours   Max. Marks: 70

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

1 a) Derive the condition for the Maximum entropy of a Discrete Source transmitting Three messages, independent of each other, with probabilities P_1, P_2 and P_3. Find the value of the Maximum Entropy.   7 M

b) Verify that the Mutual Information $I(X, Y) = H(X)-H(X/Y)$, where X and Y are the Transmitter and Receiver respectively, and H is the Corresponding Entropy.   7 M

2 a) Find the Standard Array for a (6, 3) Linear Block Code, whose generator matrix is   8 M

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

b) Find the syndrome matrix of the block code.   6 M

3 Find and plot the State Diagram of the following Convolution Encoder.   14 M
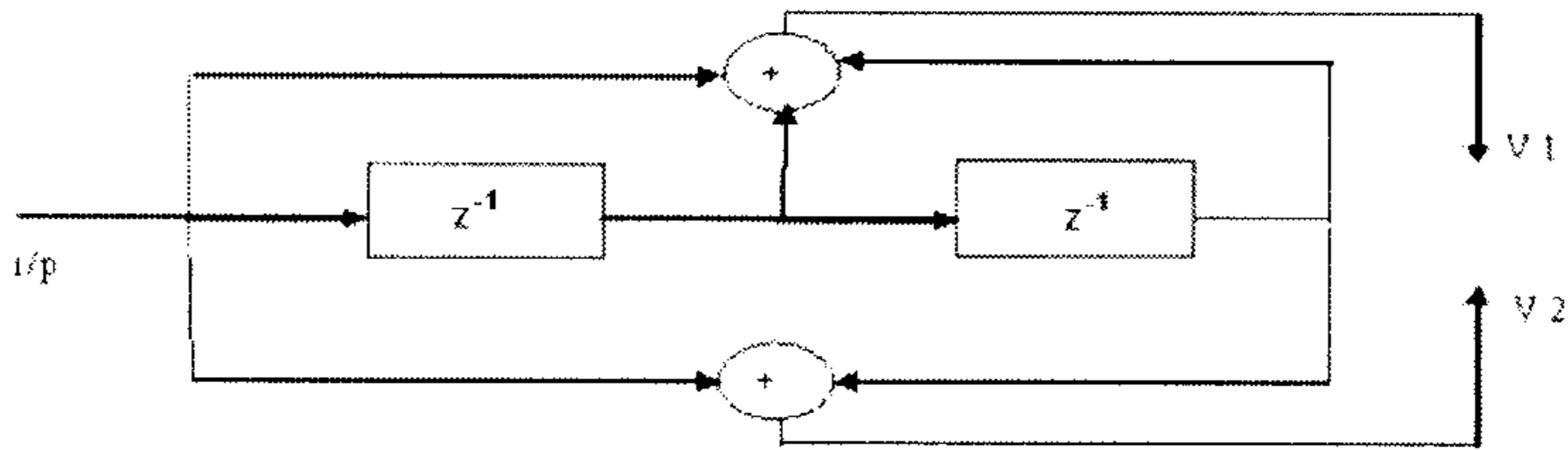
4 Write short note on the following.   14 M
    a) Hadamard codes   b) CRC codes
    c) BCH Code   d) Reed Solomon codes

5 With suitable examples and diagrams explain the following in detail   14 M
    a) Code Tree
    b) Trellis
    c) State Diagram

6 a) Explain about the Principle of Maximum Likelihood Decoding of Convolutional Codes.   8 M

   b) Discuss about Convolutional Interleaving.   6 M

7 a) State the principle of Turbo coding.   6 M

   b) What is interleaver in a turbo code? What are the reasons to use an interleaver in a Turbo Code?   8 M

8 a) Briefly explain about LDPC codes and its advantages over other error correcting codes.   8 M

   b) Explain about the Decoding of LDPC codes.   6 M