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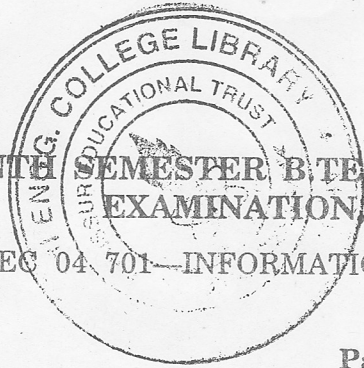Name...

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SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, DECEMBER 2011

EC 04 701—INFORMATION THEORY AND CODING

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

1. (a) Explain the terms self information, entropy, mutual information and channel capacity.

   (b) Explain about a binary symmetric channel.

   (c) Discuss on generator matrix and parity check matrix of a linear block code.

   (d) Explain the constraints to be satisfied by a polynomial to be generator polynomial of a cyclic code.

   (e) Explain binary field arithmetic with suitable example.

   (f) Explain the properties of Galois field.

   (g) Design a convolutional coder of constant length 8 and rate efficiency ½. Draw its tree diagram.

   (h) Explain about interleaved convolution codes.

   (8 × 5 = 40 marks)

Part B

2. (A) Explain Shannon Fano code and Lempel-Ziv coding assuming approximate source.

   Or

   (B) State and prove source coding theorem.

3. (A) Assuming a (7, 4) cyclic coder with a generator polynomial $1 + x + x^3$, find the systematic and non-systematic code words corresponding to message word 1101. Detect the error in the received word 0000001.

   Or

   (B) (i) Discuss the error detector and corrector capabilities of linear block code.

   (ii) Explain a linear block decoder which can detect and correct the error.

4. (A) Explain in detail BCH codes.

   Or

   (B) Explain in detail Reed Solomon codes.

5. (A) Explain Viterbi algorithm to decode convolutionally coded words.

   Or

   (B) Explain sequential decoding of convolutional coded words.

   (4 × 15 = 60 marks)