Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.704 : INFORMATION THEORY AND CODING (T)

Time : 3 Hours
Max. Marks : 100

Instructions : Answer all questions from Part – A and 2 questions from each Module from Part – B.

PART – A

Each question carries 4 marks.

(10\times4=40\text{ Marks})

1. Prove that maximum entropy for M messages can be obtained when messages are equally probable.

2. Obtain the relation for \(H(Y/X)\) of a communication channel.

3. Calculate the channel capacity for a Binary Erasure channel.

4. State and explain the necessary and sufficient condition for the code to be instantaneous.

5. Explain how error detection is possible with even parity bits.

6. Discuss the properties of cyclic codes.

7. Define rings with necessary properties.

8. Compare convolutional codes with block codes. Draw a \((2,1,2)\) convolutional encoder and write the generating sequences.

9. Define transfer function of \((n,k,m)\) convolutional encoder.

10. Draw the flow chart of Fano Algorithm for decoding.

P.T.O.
PART – B

Each question carries 10 marks. (10x6=60 Marks)

Module – 1

11. Compare analytically the different channels available for communication. 10

12. Compare Shanon Fano coding with Huffman coding. Construct optimum code using Huffman coding with following datas. Let S = {S_1, S_2, S_3, S_4, S_5} occur with Probability P = {.55, .15, .15, .10, .05}, X = {0,1}. Draw the code tree. 10

13. State and prove Shannon’s first theorem. 10

Module – 2

14. For a (6,3) linear block code, construct the standard array. What are the importance of coset leaders in the standard array? 10

15. Obtain systematic generator and Parity check matrix for (7,4) cyclic codes. Draw the general decoder scheme for (n, k) cyclic codes. 10

16. Explain encoding and decoding schemes using BCH codes. 10

Module – 3

17. Obtain coded output sequence for (3, 2, 1) convolutional encoder after drawing the encoder with \( g_1^0 = (11), g_1^0 = (10), g_2^0 = (10), g_2^0 = (01), g_2^0 = (11), g_2^0 = (00) \). Message sequences are \( u^0 = (101), u^0 = (101) \). Obtain the Generator matrix. 10

18. How the structural properties of convolutional encoder can be analysed? Explain. Draw the state diagram of a (2,1,3) encoder with \( g^0 = (111), g^0 = (101) \). 10

19. Explain with the help of diagrams DES cryptography. 10