

Total No. of Questions : 8]

SEAT No. :

P1480

[Total No. of Pages : 2

[5460]-156

T.E. (Electronics and Telecommunication Engineering)
INFORMATION THEORY AND CODING TECHNIQUES
(2012 Pattern) (Semester - II) (End Sem) (304189)

Time : 2.30 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 and Q.7 or Q.8.
- 2) figures to the right side indicate full marks.
- 3) Use of calculator is allowed.
- 4) Assume suitable data if necessary.

- Q1) a)** What is Entropy explain with the help of equation? Find the entropy of following messages having Probabilities $\{1/4, 1/4, 1/2\}$. **[6]**
- b) Prove that for the upper limit of BW the channel capacity is $C=1.44$ S/No. **[7]**
- c) Design the encode for the (7,4) cyclic code generated by $G(x)=x^3+x+1$. Explain the working of encoder with example. **[7]**

OR

- Q2) a)** What is variable length coding? Explain Shannon Fano Algorithm with the suitable example. What is coding efficiency? **[7]**
- b) For a (6, 3) systematic LBC, three parity bits given as, **[7]**
- $$C_4 = d_1 + d_2, \quad C_5 = d_2 + d_3, \quad C_6 = d_1 + d_3$$
- i) Determine generator matrix
 - ii) Construct code generated by this matrix
 - iii) Determine error capacity of the code
 - iv) Prepare syndrome decoding table
- c) Explain with suitable example the procedure to obtain the generator matrix for systematic cyclic code. **[6]**

P.T.O.

- Q3)** a) Explain in detail. [6]
 i) Minimal Polynomial
 ii) Generator Polynomial
 b) Explain in detail the decoding of RS code. [5]
 c) Construct the extension field GF (2^3) if $m = 3$ and $P(x) = 1+x+x^3$ over GF (2). [5]

OR

- Q4)** a) Find generator polynomial for double error correction of BCH code over GF (2^5) [6]
 b) Determine the encoded message for the following 8-bit data codes using the following CRC generating polynomial $P(x)=x^3+x^2+1$. [10]
 i) 11001100 ii) 01011111

- Q5)** a) Explain Viterbi Decoding Algorithm in the Convolution Coding using a suitable example. [8]
 b) Explain in detail. [8]
 i) LDPC
 ii) Trellis Diagram

OR

- Q6)** a) Explain with suitable example [8]
 i) State Diagram
 ii) Code Tree
 b) Explain with suitable example. [8]
 i) Sequential Decoding
 ii) TURBO codes

- Q7)** a) What are the implications of Error Probability Plan and BW Efficiency Plan? [8]
 b) What is TCM? Explain the TCM encoder. [10]

OR

- Q8)** a) Explain the parameters used in designing and evaluating the communication system. (Like power, BW etc.) [10]
 b) Explain in detail the Set Partitioning Method for 8 PSK. [8]

