[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 massages 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]**

       C4 = d1 + d2, C5 = d2 + d3, C6 = d1 +d3

       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]**

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 massage 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]**

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