Total No. of Questions : 8]

SEAT No. :

P1990

[Total No. of Pages : 2

[4858]-1046

T.E. (E & TC) (End - Semester) (Semester - II)

INFORMATION THEORY & LODING TECHNIQUES

(2012 Pattern)

Time : 2.½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or 2, Q3 or 4, Q5 or 6, Q7 or 8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Assume suitable data, if necessary.***
4) ***Use of logarithmic tables slide rule, mollier charts, electronic pocket calculator and steam tables is allowed.***

Q1) a) Design a Huffman code for a source generating 4 different types of messages with probabilities 0.3, 0.2, 0.4, 0.1. Find the coding efficiency. **[7]**

b) What are Golay codes? Explain with suitable example. **[7]**

c) Write the procedure for coding of cyclic codes. **[6]**

OR

Q2) a) A 3 bit PCM system generates 1000 samples/sec. If the quantized samples are produced by the system with probabilities $\left\{\frac{1}{4}, \frac{1}{4}, \frac{1}{8}, \frac{1}{8}, \frac{1}{16}, \frac{1}{16}, \frac{1}{16}, \frac{1}{16}\right\}$ Then find the rate of information. If the samples are equiprobable, what will be rate of information? **[7]**

b) What are Hamming codes? Explain with suitable example. **[7]**

c) For a (7,4) cyclic code, with generator polynonial $g(x) = x^3 + x^2 + 1$, what will be codewords for following message words. **[6]**

i) 1011 ii) 1110

Q3) a) Find the generator polynonial for BCH code with codeword length n = 15 and error correcting capability $t_c = 2$. **[10]**

b) Explain Go-Back-N ARQ. **[6]**

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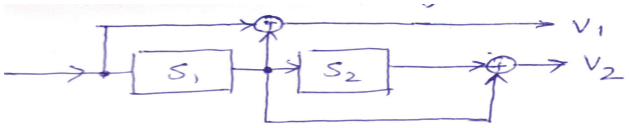
OR

Q4) a) For a (7,5) RS code, the received codeword polynomid is given as: $r(x)=x^5+\alpha^5x^4+\alpha^2x^3+x^2+\alpha^6x+\alpha^3$ where α is element of aF(2^3). Find the corrected codeword polynomial, if there is single error in the received codeword. **[8]**

b) Write features of BCH codes. **[4]**

c) What is FEC & ARQ systems? **[4]**

Q5) a) Draw the trellis diagram for following encoder **[8]**



b) Explain with example polynomial description of convolutional codes. **[8]**

c) Draw the block diagram for coding process Turbo codes. **[2]**

OR

Q6) a) Explain viterbi's algorithm for decoding of convolutional codes. **[8]**

b) Explain generating function for convolutional codes. **[8]**

c) Write any two features of LDPC codes. **[2]**

Q7) a) What are the goals of communication system designer? Explain any three of them. **[6]**

b) What is Nyquist minimum bandwidth? **[4]**

c) Explain in brief trade off between modulation and coding. **[4]**

OR

Q8) a) Explain how coding gain is improved in TCM. **[8]**

b) Write shannon-Hartley capacity theorem. What are its implications? **[8]**