

Total No. of Questions : 8]

SEAT No. :

P3602

[5560]-557

[Total No. of Pages : 2

T.E.(E&TC)

**INFORMATION THEORY, CODING & COMMUNICATION NETWORK
(2015 Course) (Semester - II)**

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *All questions are compulsory.*
- 2) *Figures to the right indicate full marks.*

Q1) a) A source emits 1000 symbols per second from a range of 5 symbols with probabilities $\left[\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{16}\right]$ find source entropy and information rate. **[6]**

b) For a systematic (7,4) LBC, the parity matrix is given by [110; 011; 111; 101] **[7]**

- i) Construct Generator matrix
 - ii) Find code vectors for messages 1100, 0011
 - iii) If the received code vector is $R = 0111101$, find the corrected codeword.
- c)** Construct $GF(2^3)$ finite field for a primitive polynomial $x^3 + x + 1$. Find minimal polynomials for all elements. **[7]**

OR

Q2) a) Apply Huffman coding for the symbols [A E H N G S] generated by a DMS with probabilities [0.19 0.15 0.2 0.16 0.4 0.08]. Also calculate coding efficiency. **[7]**

b) State information capacity theorem. A channel has B.W. of 5kHz and signal to Noise power ratio of 63. Determine the BW needed if SNR is reduced to 31. **[7]**

c) Obtain Generator & Parity check matrix for (7,4) systematic cyclic code, using Generator polynomial $G(x) = x^3 + x + 1$. **[6]**

Q3) a) Define following terms related to convolutional code **[8]**

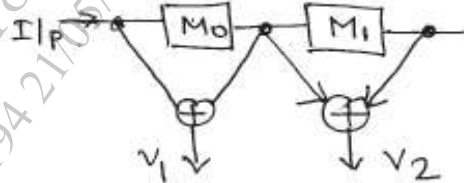
- i) Constraint length
- ii) Code rate
- iii) Free length
- iv) Path metric

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- b) For (15,7) double error correcting BCH code with primitive poly $p(x) = x^4 + x + 1$, the received codeword polynomial is $r(x) = x^9 + x^6 + x^5 + x^4 + x + 1$. Find the corrected codeword. [10]

OR

- Q4) a) For the convolutional encoder shown in fig, show state table, state diagram and code tree. Find the codeword sequence for input message sequence 1011 [8]



- b) For (15,11) RS code, find generator polynomial find code for the message polynomial $(x + 1)$. [10]

- Q5) a) Explain classes of transmission media & give example of each. [8]
b) What is Network? Compare OSI & TCP/IP models. [8]

OR

- Q6) a) Explain types of addresses in TCP-IP. [8]
b) Explain design issues for Network layers. [8]

- Q7) a) What is ARQ? Explain three types of ARQ. [8]
b) Explain different data transfer modes of HDLC. [8]

OR

- Q8) a) Give functions/services of DLL. Compare Data Link Layer with physical layer. [8]
b) Draw & explain HDLC frame format. Explain the control field used in HDLC for different frames types. [8]

