

[5460] - 557

T.E. (E &amp; TC)

**Information Theory, Coding & Communication Networks**  
**(2015 Pattern) (Semester - II)**

Time : 2½ 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) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.

- Q1) a)** A DMS channel has following symbols and their probabilities. Apply Huffman coding technique to generate a code with minimum variance. Calculate code efficiency. [8]

$S_0$	$S_1$	$S_2$	$S_3$	$S_4$	$S_5$	$S_6$
0.125	0.0625	0.25	0.0625	0.125	0.125	0.25

- b) Draw syndrome calculator for (7, 4) cyclic decoder and obtain syndrome for received codeword [1001001] [6]
- c) Define channel capacity. State channel coding theorem. What are parity bits? [6]

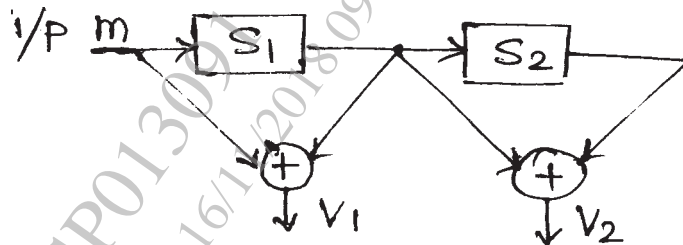
OR

- Q2) a)** Apply L.Z. algorithm to find the code for following bit stream : 1110100110001011010. Recover original sequence for code word 01000. [6]
- b) Obtain codewords for (6,3) LBC which has generator matrix of  $G = [100101; 010011; 001110]$ . Find all possible codewords. obtain corrected codeword, if received codeword is  $r = [001110]$ . [8]
  - c) For cyclic code with generator polynomial  $g(x) = x^3 + x^2 + 1$ , obtain the codewords for [1011], [1010] & [1100]. [6]

P.T.O.

**Q3) a)** Design a BCH code with block length  $n = 15$  and error correcting capacity  $t_c = 1,2$  [9]

b) For the convolutional encoder shown below, decode the encoded sequence [1011111101] using viterbi algorithm. [9]



OR

**Q4) a)** Write short notes on sequential decoding and viterbi decoding. [8]

b) For binary BCH (15, 5) triple error correcting code with generator polynomial, [10]

$$g(x) = x^{10} + x^8 + x^5 + x^4 + x^2 + x + 1$$

Find out the error locations if the received polynomial is  $r(x) = x^5 + x^3$ .

**Q5) a)** Draw OSI model and explain functions of each layer. [8]

b) Explain network design issues. [8]

OR

**Q6) a)** Compare OSI and TCP/IP models. [8]

b) What is addressing? Explain different types of addressing. [8]

**Q7) a)** What is error control & flow control? Explain stop & wait ARQ protocol. [8]

b) Explain HDLC protocol & its frame structure. [8]

OR

**Q8) a)** Explain different transfer modes of HDLC. [8]

b) What is framing? Explain different types of framing methods. [8]

