



1 (a) Discuss and categorize channels for information communication.

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(b) What is source coding theorem ? State its utility.

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UNIT - II

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2 Explain Huffman coding with help of suitable example.

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OR

2 (a) Consider a source  $S = [S_1, S_2]$  with probabilities  $3/4$  and  $1/4$  respectively. Obtain Shannon-fano code for source  $S$ , its 2<sup>nd</sup> and 3<sup>rd</sup> extensions. Calculate efficiency for each case. <http://www.rtuonline.com>

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(b) Write short note : (any one)

(i) Noise free channel

(ii) Shannon's theorem.

3+3=6

UNIT - III

3 Explain the need of error correcting codes. How its Encoding/Decoding take place ? Explain with help of parity example.

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OR

(a) Explain the types of errors and classification of codes.

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(b) What is coding efficiency ? Show that coding efficiency is maximum when  $P(0) = P(1)$ .

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### UNIT - IV

- 4 The intersection of cyclic codes is cyclic. Find the generator polynomial of  $C_1 \cap C_2$ .

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OR

- 4 Design a (4,2) LBC :
- (i) Find the generator matrix for code vector set
  - (ii) Find the parity check matrix.
  - (iii) Make an encoding ckt
  - (iv) Draw the encoding ckt
  - (v) Draw the syndrome calculation ckt.

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### UNIT - V

- 5 Write short notes on :
- (a) Maximum likelihood decoding of convolution codes.
  - (b) Describe Viterbi Algorithm.

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OR

- 5 (a) Code tree.
- (b) Decoding Probability of Convolution code.

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