

10-12-2019

Roll No.

Printed Pages : 2

35007

BT-5 / D-19

INFORMATION THEORY AND CODING

Paper-ECE-305E

Time allowed : 3 hours]

[Maximum marks : 100

Note :- Attempt any five questions by selecting at least one question from each unit.

Unit-I

1. (a) A fair die is tossed twice. Given that a 3 appears on the first toss, what is probability of obtaining the sum 7 in two tosses? 10
- (b) What is Markov process and how it is important in communication system? 10
2. (a) What do you understand by Random Process? Explain the Gaussian distribution of a random variable. 10
- (b) What is Expectation and Moment of a distribution of Random variable? 10

Unit-II

3. (a) Consider a Discrete Memory Less Source with source probabilities $\{0.35, 0.20, 0.20, 0.10, 0.10, .05\}$. Find the source Entropy, $H(X)$. 10
- (b) Explain average mutual information and average Conditional Self information with mathematical formulation. 10

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(2)

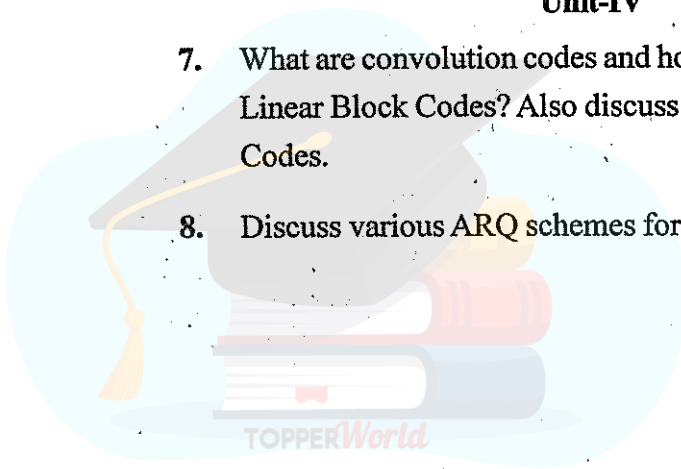
4. Consider a DMS with seven possible symbols with probabilities $\{0.46, 0.30, 0.12, 0.06, 0.03, 0.02, 0.01\}$. Determine the Huffman Code for this source. Compute the efficiency of the code. 20

Unit-III

5. Consider the following generator Matrix $G = [1\ 0\ 0\ 0\ 1\ 1; 0\ 1\ 0\ 1\ 0\ 1; 0\ 0\ 1\ 1\ 1\ 0]$
- (a) Generate all possible code words. 5
 - (b) Find the parity check matrix H 5
 - (c) What is minimum distance of this code? 5
 - (d) How many errors can this code correct? 5
6. Explain Syndrome Decoding for decoding Linear Block Codes. Find all possible cyclic code words for generator polynomial x^2+x+1 and verify they are cyclic in nature. 20

Unit-IV

7. What are convolution codes and how they are different from Linear Block Codes? Also discuss decoding of Convolution Codes. 20
8. Discuss various ARQ schemes for burst error correction. 20



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