10-12-2019

Roll No. .....
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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

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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