M. TECH Ist Semester (ECE)

Information and Communication Theory

Important Questions

Q1.   In a CRC, if the dataword is 5 bits and the codeword is 8 bits, how many 0's need to be added to dataword to make the dividend? What is the size of the remainder? What is the size of the divisor?

Q2.   Can the value of traditional checksum be all 0's (in binary)? Defend your answer.

Q3.   Using Shanon-Fame algorithm, find the code words for six messages occurring with probabilities 1/3, 1/3, 1/6, 1/12, 1/24, and 1/24.

Q4.   A signal X (amplitude) is random variable uniformly distributed in range (-1,1). This signal is passed through an amplifier of gain Z. The output Y is also a random variable uniformly distributed over the range (-2,2). Determine the entropy H(X) and H(Y).

Q5.   Find the Channel capacity for discrete channel performance of linear block

Q6.   What are mutual and joint information? Derive an expression for both.

Q7.   We can create a general formula for correcting any number of errors (m) in a codeword of size (n). Develop such a formula. Use the combination of n objects taking x objects at a time.

Q8.   What are Idempotent and Mattson Solomon polynomials. Explain where these are used.

Q9.   What are Reed Solomon codes? Explain

Q10   Compare the performance of linear block codes and convolution codes.

Q11.   What is code incurable probability? Explain its upper and lower bounds.

Q12. What is a binary symmetric channel? Which codes are suitable for such channel and why?

Q13   What is weight enumerator? How it is applicable and where?

Q14   Write short notes on: a) Justeen codes   b)Rate distortion functions.

Q15.   Find the mutual information and channel capacity of the channel as shown in Fig. 1. Give P (x)
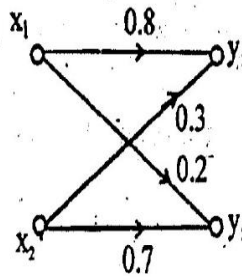
Q16. Define channel capacity and calculate channel capacity of binary symmetric and binary erasure channel.

Q17. Describe in detail the encoding and decoding methods for cyclic codes with the help of suitable diagram.

Q18. Explain and discuss Viterbi algorithm for decoding of convolution codes.

Q19. Explain the concept of information and entropy. Also explain the important properties of entropy.

Q20. Explain the following

1) Hamming distance
2) Hamming bound
3) Free distance
4) Coding efficiency

Q21. Explain in detail BCH codes

Q22. Explain with the help of example Rate distortion function.

Q23. Write short note on Continuous entropy

Q24. Explain in detail Optimum coding scheme.

Q25. What do you know about Shannon Fano algorithm. Explain in detail with suitable examples.