Seat No: _____   Enrollment No: _____

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech., Winter 2019-20 Examination

Semester: 5   Date: 03/12/2019
Subject Code: 03114332   Time: 10:30am to 1:00pm
Subject Name: Introduction to Information Theory and Coding   Total Marks: 60

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - All are compulsory.   **(15)**

1. The capacity of Gaussian channel is

   a. $C = 2B(1+S/N)$ bits/s **b.** $C = B^2(1+S/N)$ bits/s **c.** $C = B(1+S/N)$ bits/s **d.** $C = B(1+S/N)2$ bits/s

2. The channel capacity is

   a. The maximum information transmitted by one symbol over the channel

   b. Information contained in a signal

   c. The amplitude of the modulated signal

   d. All of the above

3. On which factor/s do/does the channel capacity depend/s in the communication system?

   a. Bandwidth   **b.** Signal to Noise Ratio   **c.** Both a and b   **d.** None of the above

4. The negative statement for Shannon's theorem states that

   a. If $R > C$, the error probability increases towards Unity

   b. If $R < C$, the error probability is very small

   c. Both a & b

   d. None of the above

5. Basically, Galois field consists of _____ number of elements.

   a. Finite   **b.** Infinite   **c.** Both a and b   **d.** None of the above

6. _____buffer size is required by the interleaved codes at the transmitter for the accumulation of λ code words.

7. _____plays a cardinal role in supporting the results obtained regarding the information capacity theorem.

8. In digital communication system, smaller the code rate,_____ are the redundant bits.

9. Block codes can achieve a larger coding gain than convolution coding. State (True/False)_____.

10. Fano's algorithm searches all the paths of trellis diagram at the same time to find the most probable path. State whether True or False._____.

11. What is the capacity of a binary symmetric channel, given H(P) is a binary entropy function?

12. In Repetition Code, how many information bit/s is/are present in addition to n-1 parity

bits?

13.In a linear code,what is the minimum Hamming distance between any two code words is minimum weight of any non-zero code word?

14. Define the variance.

15.What is the unit of average mutual information?

Q.2 Answer the following questions. (Attempt any three) **(15)**

    A) Explain symmetric channel?

    B) Explain an entropy?

    C) Explain an information rate?

    D) How correction and detection of errors are performed?

Q.3 A) What is Shanon fano coding?Explain with an example. **(07)**

    B) What is hamming distance?State its function. **(08)**

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OR

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    B) What is a channel capacity?Explain. **(08)**

Q.4 A) Explain Viterbi decoding algorithm. **(07)**

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OR

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    A) Explain Knapsack encryption. **(07)**

    B) Explain RSA with an example. **(08)**