



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

| WINTER-2025 | |
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| Exam Seat No.: | |
| Academic Year:2025-2026 | Semester:III |
| Class:SY | Program:B.Tech |
| Branch Code:INT | Pattern:2022 |
| Name of Course:Digital Communication | Course Code:INT222005 |
| Max. Marks:60 | Duration:2.30 Hrs. |

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Marks CO

Question No. 1

- 1a) Explain the Steps of Huffman coding algorithm with example (6) CO1

Question No. 2

- 2a) What is Data Communication? List and explain fundamental characteristics of Data Communication. (6) CO2

Question No. 3

- 3a) Explain Bipolar Line Coding Scheme. List out the Advantages and Disadvantages of Bipolar Line Coding Scheme (5) CO3

OR

- 3b) List out the Difference between Manchester and Differential Manchester. (5) CO3

- 3c) Explain Frequency Shift keying technique with proper diagram (5) CO3

OR

- 3d) Explain Quantization, Quantization level and steps in Quantization. (5) CO3

- 3e) Explain Pulse Code Modulator Decoder with block diagram (6) CO3

OR

- 3f) Represent the data element-1011001 in to Unipolar, NRZ-L, NRZ-I, RZ, Manchester and Differential Manchester Scheme and explain each representation (6) CO3

Question No. 4

- 4a) List out the Types of Errors with suitable example (4) CO4

OR

- 4b) Assume in a simple parity-check code, the sender sends the dataword 1110. The codeword created from this dataword is 11101, which is transmitted. Explain all possible transmission scenarios for this case and prove that "A simple parity-check code can detect an odd number of errors." (4) CO4

4c) Explain Error Detection Versus Correction with suitable example (4) CO4

OR

4d) Explain Minimum Hamming Distance. Suppose there are four strings 000, 011, 101 and 110 that are transmitted. Calculate the Minimum Hamming Distance. (4) CO4

4e) A bit stream 100100 is transmitted using the standard CRC method. The generator polynomial is $[x^3+x^2+1]$. (8) CO4

a) What is the actual bit string transmitted?

b) Consider the Data Bit obtain in the (a) is not inverted during transmission Prove that at the receiver side, it is error-free

OR

4f) Explain Cyclic Redundancy Check (CRC). Explain CRC Encoder and Decoder with suitable diagram. (8) CO4

Question No. 5

5a) Explain Rail-Fence Technique with example (5) CO5

OR

5b) Explain Homophonic Substitution Cipher with suitable example. (5) CO5

5c) List out the Difference Between Symmetric and Asymmetric Key Encryption. (5) CO5

OR

5d) Explain Hill Cipher and Hill Cipher Encryption with example. (5) CO5

5e) Explain RSA algorithm with one example. Show the step by step calculation for Plain text to Cipher text conversion. (6) CO5

OR

5f) Explain the Playfair Cipher method. Create the matrix for the following keyword- 1)Computer 2)Monarchy (6) CO5

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