

Q. P. Code : 16780

(3 Hours)

[Total Marks: 80]

N.B.

- 1) Question no.1 is compulsory.
  - 2) Attempt any three questions out of remaining five questions.
  - 3) Assumptions made should be clearly stated.
  - 4) Illustrate answers with sketches wherever required.
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1. a Give the schematic diagram for M-ary optimum receiver and explain its operation for optimum detection of received message signal. 10
  - b A DMS has an alphabets of five letters  $x_i$ ,  $i = 1, 2, \dots, 5$  with probabilities 0.4, 0.2, 0.2, 0.1, 0.1. Find the average length, entropy and efficiency of the code. 10
  2. a Design optimum Non Coherent receiver in random phase channels. 10
  - b Design and implement the M-ary non coherent detector for equiprobable equal energy signals using matched filters. 10
  3. a Describe the concept of ISI. Explain partial response signals for Band limited signals with controlled ISI. 10
  - b Explain K-L expansion approach to detect signal in colored Gaussian noise.
  4. a Define the following terms: 1) rms delay spread. 2) Coherence bandwidth 3) Coherence time and 4) Doppler Spread. How they are related? 10
  - b Explain in brief different methods used for combating frequency selective fading. 10
  5. a Explain optimum receiver in Rayleigh channel and also evaluate the performance of Non-Coherent receivers in terms of probability of error in Rayleigh channels. 10
  - B Explain I-Q modulator and demodulator using real signals with functional diagram. 10
  6. Write short notes on : 20
    - (a) Temporal Waveform coding for analog sources.
    - (b) BAY'S detection of received signal.
    - (c) Lempel-Zive coding algorithm.
    - (d) Fixed Length Coding.