

(3 Hours)

Total Marks: 80

N.B.: (1) Question No. 1 is **compulsory**.

(2) Solve any **three** from remaining **five** questions.

- Q1. a) Prove that the entropy $H(x)$ of the source is at most at $\log(n)$ 05
 b) Explain various parameters associated with Eye Pattern 05
 c) Compare slow-frequency hopping with fast-frequency hopping. Draw hopping pattern for each. 05
 d) Write the decoding rates for Duo binary waveform, what are the draw backs. 05
- Q2. (a) Explain Average cost of decision in Bay's detection of received signals. 10
 (b) What do you mean by ISI? State and prove Nyquist theorem for band limited channel. 10
- Q3. (a) Give the schematic diagram for M-ary optimum receiver using Matched filter. Also derive the probability of error for orthogonal signal set. 10
 (b) Explain in detail the optimum receivers in Rician channel 10
- Q4. (a) Explain in brief analogy for spectral broadening in fading channels. 10
 (b) Explain I-Q modulation and demodulation using real signals with functional diagram. 10
- Q5. (a) Explain Time sampling approach to detect signal in color Gaussian Noise. 10
 (b) What do you mean by Relevant and irrelevant noise? Explain their role in signal detection 10
- Q6. Write short note on 20
 1. L-Z -78 Algorithm
 2. Explain time-variant nature of the channel in Doppler Shift domain.
 3. Imperfect Carrier Synchronization effects
 4. Linear equalizer with MSE criterion
