

(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  $\log(n)$  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 drawbacks. 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

\*\*\*\*\*