

- N.B: 1) Question number 1 is compulsory.
2) Solve any three from remaining.



- Q1 Solve any **Four** 20
- Explain coding for Analog sources.
 - Explain Baye's detection of received signal
 - Comment on Lempel algorithm LM 77
 - Explain Average Mutual Information and Entropy.
 - Explain effects of Imperfect carrier synchronization.
- Q2 (a) Explain the optimum detection of M-ary using Matched filters of received message signal. 10
- (b) Describe basic concepts of ISI? Design bandlimited signal for controlled ISI. 10
- Q3 (a) Design and implement M-ary Non-coherent receiver for equal energy signal in random phase channels. 10
- (b) Explain optimum detection in Rayleigh Channels. 10
- Q4 (a) 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 average length and efficiency of the code. 10
- (b) Draw and explain the optimum waveform receiver in colored Gaussian noise using K-L Expansion approach 10
- Q5 (a) Explain relevant and irrelevant noise? Also prove that n_j and n_k are uncorrelated and independent Gaussian random variables.
- (b) Explain time-variant nature of the channel in Doppler-shift domain. 10
- Q6 Write short note on any **Three** 20
- Temporal waveform coding
 - Small scale fading
 - MSE criterion for infinite length equalizer
 - Time and frequency domain characteristics of duobinary signal.
