

National Institute of Technology, Delhi

Name of the Examination: B.Tech
End Semester Examination (Autumn 2022)

Branch : ECE
Title of the Course : Digital Communication
Semester : 5th
Course Code : ECB-303

Maximum Marks: 50

Time: 3 Hours

Note: All Questions are Compulsory. Assume the data, if required.

Section-A

- Q.1 (a) Differentiate between Bit Rate and Baud Rate with suitable example. (3)
(b) Explain the need and concept of Companding. What are its basic types? (3)
(c) Explain the effect of Under Sampling in detail. How to mitigate this effect? (4)
- Q.2 (a) The bit sequence 1011101011 is to be transmitted using Split Phase Manchester and Polar Quaternary formats. Draw and explain the waveforms. (3)
(b) Explain the Maximum Likelihood Receiver Structure in detail. (7)
- Q.3 (a) Derive an expression for Euclidean distance for FSK. (3)
(b) In a Delta modulation system, the voice signal is sampled at a rate of 64,000 samples/sec. The maximum signal amplitude is 1. Determine:
(i) Minimum value of step size to avoid slope overload.
(ii) Quantization noise power if voice signal bandwidth is 3.5 kHz.
(iii) Assuming voice signal to be sinusoidal, determine output signal power and SNR. (4)
(c) Calculate the maximum bit rate for a channel having bandwidth of 3100 Hz and the signal to noise ratio of 20 dB. Also Calculate the number of levels required to transmit at the maximum bit rate. (3)
- (3*10=30)**

Section-B

- Q.84 Explain Delta Modulation in detail, transmitter and receiver structure. Explain the distortions in Delta Modulation. Derive the condition for avoiding the Slope Overload Error. (10)
- Q.75 Explain mathematically in detail the concept of QPSK along with Transmitter and receiver block diagram and necessary equations. Compare it with DPSK Modulation. (10)
- (2*10=20)**

*****BEST WISHES*****