

221302

May, 2019

**M.Tech. (ECE) - 3rd Semester
Digital Communication (EI6-C 703)**

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) What do you mean by AWGN ? (1.5)
(b) Write the properties of Line Coding. (1.5)
(c) What is the effect of under sampling. (1.5)
(d) What do you mean by Quantizer error? (1.5)
(e) Write the drawbacks of PAM. (1.5)
(f) What is the crosstalk in PAM/TDM System? (1.5)
(g) What are the advantages of digital communication? (1.5)
(h) What is the concept of Optimum receiver. (1.5)
(i) What do you mean by probability of error? (1.5)
(j) What is the use of repeater in PCM? (1.5)

PART-B

2. (a) A low pass signal of 3KHz bandwidth and amplitude over -5 volt to $+5$ volt range is sampled at Nyquist rate and converted to 8 bit PCM using uniform quantizer. The mean square value of message signal is 2 Volt-squared. Calculate:-
- (i) The normalized power for quantization noise.
 - (ii) The bit Transmission rate.
 - (iii) The signal to quantization noise ratio in dB.
- (7.5)
- (b) What do you mean by Companding? Differentiate μ -law Companding and A-law Companding. (7.5)
3. (a) What do you mean by Matched filter? Calculate the probability of error for matched filters. (7.5)
- (b) The bit sequence 1011101011 is to be transmitted using following format:-
- (i) Unipolar RZ and NRZ
 - (ii) Bipolar RZ and NRZ
 - (iii) Split phase Manchester
 - (iv) Polar quaternary NRZ
- (7.5)
4. (a) Explain Gram -schmidt orthogonalization procedure in detail. (7.5)
- (b) State and prove the Flat top sampling. How can you reconstruct the signal from its sample? (7.5)
5. (a) What do you mean by Nyquist's criterion for distortion less baseband binary transmission? Explain it with detail. (7.5)
- (b) Draw the block diagram of DPSK modulator and demodulator and explain how synchronization problem is avoided for its detection. (7.5)
6. (a) What do you mean by coherent and non coherent digital modulation technique? Compare advantage and disadvantages of MSK with QPSK. (7.5)
- (b) Draw the signal space representation of QPSK and BPSK signals. Show that for the same data rate and same bit energy, they have same bit error rate probability on the same AWGN channel. Although one of the signals occupy half the bandwidth. (7.5)
7. (a) Explain Differential pulse code modulation with its modulator and Demodulator. Also explain the importance of prediction in DPCM. (7.5)
- (b) What do you mean by ISI explain it with block diagram? What are its causes and remedies? (7.5)