(Please write your Exam Roll No.) Exam Roll No. 0111523017

END TERM EXAMINATION

FIFTH SEMESTER [B.TECH] DECEMBER- 2019

Paper Code: ETEC-303 **Subject: Digital Communication**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt any five questions including Q.No1 which is compulsory. Select one question from each unit.

Q1 (a) Explain the process of Companding. Discuss its significance in communication system. (5)

(b) Discuss the physical significance of PSD. Also explain its different properties. (5)

(c) What is Inter symbol interference? How the ISI error can be removed? (5)

(d) What is the difference between coherent & non-coherent digital modulation techniques? (5)

(e) Which system is better among ASK, PSK & FSK and why? (5)

UNIT-I

Q2 (a) What is line coding? Draw the wave form for the binary data 11010110. (6)
(i) NRZ polar (ii) AMI (iii) Manchestar coding

(b) Explain the ADM system. Derive the expression for slope overload noise. (6.5)

Q3 (a) Explain the necessity of line codes for data transmission. State different types of line codes. Plot power spectral density of NRZ signal. (6)

(b) Derive the expression of signal to noise ratio for PCM system. (6.5)

UNIT-II

Q4 (a) Define Random variable. Explain the continuous and discrete distribution function. (6)

(b) Consider a sinusoidal process X(t) denoted by $X(t) = A\cos(2\pi ft + \theta)$ where A, f are constant and θ is uniformly distributed random variable. $f(\theta) = \left\{\frac{1}{2}, 0 \le \theta \le 2\pi \text{ and } 0 \text{ elsewhere}\right\}$. Show that the process is Ergodic in both mean and autocorrelation function. (6.5)

Q5 (a) Assume that 8 digit binary words are being transmitted over a noisy channel, with a per digit error probability of 0.01. Calculate that 3 digits out of 8 are in error. Also obtain mean and variance for random variable. Using binomial distribution. (6)

(b) What is the difference between stationary and non stationary stochastic process? Noise signal is a non stationary random process. State true or False and Justify your answer? (6.5)

UNIT-III

Q6 (a) What is optimum receiver? Define the transfer function of optimum receiver. (6)

(b) Derive the probability of error for matched filter. (6.5)

Q7 (a) Write short notes on a analysis of digital receiver (6)
(i) Correlator receiver (ii) Coherent receiver

(b) Explain the Gram-Schmidt orthogonalization procedure (6.5)

UNIT-IV

Q8 (a) What is QPSK? Explain with diagram. (6)

(b) Draw signal space diagram of ASK, FSK and PSK. (6.5)

Q9 (a) Compare the following:- (6)
(i) BPSK (ii) DPSK

(b) Derive the expression for error probability of BASK system with coherent detection. (6.5)

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