

Total No. of Questions : 8]

SEAT No. :

P1723

[Total No. of Pages : 2

[5460]-551

T.E. (E & TC)

DIGITAL COMMUNICATION

(2015 Pattern) (Semester - I)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.

- Q1)** a) Derive Mathematical expression for Signal to noise ratio in PCM System. [8]
b) Compare PCM and DM systems. [6]
c) What is a strictly stationary process? Explain. [6]

OR.

- Q2)** a) What is bit synchronization? Explain Early –late and early gate method?[8]
b) A binary channel with 64 kbps bit rate is available for PCM Voice transmission find [8]
i) Number of quantization levels
ii) Number of bits per sample
iii) Sampling frequency, the voice signal is band limited to 3.4 kHz.
c) What are the properties of line codes. [4]

- Q3)** a) Explain Maximum likelihood ratio test. (LRT) [4]
b) Derive the expression of SNR and Probability of error for Matched Filter in presence of AWGN noise channel. [8]
c) Define Gaussian process state its properties. [4]

OR

P.T.O.

- Q4)** a) Explain geometrical representation of signal and Gram-Schmitt Procedure. [4]
 b) Derive expression of SNR for Integrator and Dump circuit. [8]
 c) State the various properties of Match filter. [4]
- Q5)** a) Find the probability of error for coherent FSK when amplitude of I/P at coherent optimal receiver is 10mv and frequency 10 MHz, the signal corrupted with white noise of PSD 10^{-9} W/Hz, the data rate is 100 kbps. [erfc(1.01) = 0.1531, erfc(1.11) = 0.1164, erfc(1.22) = 0.0844, erfc(1.33) = 0.0599]. [8]
 b) Explain QPSK generation with neat diagram and waveform. [4]
 c) Compare the performance of modulation schemes, BPSK, BFSK, QPSK, DPSK, M-ary PSK, M-ary FSK w.r.t. [6]
 i) BW
 ii) PSD
 iii) Probability of Error
 iv) Application Bit rate

OR

- Q6)** a) Derive the expression of Probability of error for BPSK receiver in presence of AWGN noise channel. [8]
 b) Explain coherent binary FSK signal generation [4]
 c) Explain M-ary PSK transmitter and receiver. [6]
- Q7)** a) What is PN sequence? Explain its properties with 4-stage Shift register. [6]
 b) What are the advantages of FHSS. [4]
 c) Explain the concept of spread spectrum in advanced digital communication system. [6]

OR

- Q8)** a) Explain the concept of Processing gain, Probability of error and Concept of jamming. [6]
 b) Explain Fast and Slow frequency hopping techniques. [6]
 c) Derive PSD for DSSS system and enlist its disadvantages. [4]

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