

Total No. of Questions : 12]

SEAT No. :

P2325

[4758]-60

[Total No. of Pages : 3

T.E. (Electronics)

DATA COMMUNICATION

(2008 Course) (Semester-I) (304202)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) Answer any 3 questions from each section.*
- 2) Answers to the two sections should be written in separate books.*
- 3) Neat diagrams must be drawn whenever necessary.*
- 4) Figures to the right indicate full marks.*
- 5) Use of electronic pocket calculator and steam tables is allowed.*
- 6) Assume suitable data if necessary.*

SECTION-I

- Q1)** a) Define cross correlation function. State and explain any three properties of cross correlation function. [8]
- b) Explain noise reduction techniques Low Pass Filter and Matched Filters. [8]

OR

- Q2)** a) Explain in brief the different types of random processes with suitable examples. [8]
- b) Explain different properties of CDF and PDF for discrete and continuous random variables. [8]
- Q3)** a) For the sequence 10011011, sketch the waveform using the following data formats: [10]
- i) Unipolar Rz
 - ii) Polar NRz
 - iii) Alternate Mark Inversion
 - iv) Split phase Manchester coding. Draw the corresponding spectrum of the above formats and explain.
- b) What is synchronizer? Explain any one type of bit synchronizer. [6]

OR

P.T.O.

- Q4)** a) Why synchronization is necessary in data communication? Explain bit and frame synchronization using suitable sketch. [8]
- b) What is inter symbol interference? Explain its cause and remedies to avoid it. [8]

- Q5)** a) For a (6, 3) systematic LBC, three parity bits are given as, $C_4 = d_1 + d_2$, $C_5 = d_1 + d_3$, $C_6 = d_1 + d_2 + d_3$. [10]

- i) Determine generator matrix.
 - ii) Construct code generated by this matrix.
 - iii) Determine error capacity of the code.
 - iv) Prepare syndrome decoding table.
 - v) If received vector is 101011, determine message word.
- b) Explain in detail Viterbi decoding algorithm with an example. [8]

OR

- Q6)** Write short notes on: [18]

- a) Binomial, Poisson's.
- b) Eye diagram.
- c) Linear block codes.
- d) Error correction and detection techniques.

SECTION-II

- Q7)** a) What is mutual information? How channel capacity is related to mutual information? Explain with mathematical support. [8]
- b) Explain Huffman coding and decoding with example. [8]

OR

- Q8)** a) What is entropy? For a discrete memory less source what is the upperbound on entropy. Show that equiprobable messages results to maximum entropy. [8]
- b) Explain Shannon - Fano coding with example. [8]

- Q9)** a) Explain the transmission and reception of BPSK with mathematical expression. [8]
- b) In a digital communication system, the bit rate of NRZ data stream is 1 Mbps and carrier frequency of transmission is 100 MHz. Find the symbol rate of transmission and band width requirement of the channel in the following cases. [8]
- i) BPSK
 - ii) QPSK

OR

- Q10)** a) Explain the necessity of continuous PSK. State and explain the basic principles of MSK with block schematic and suitable waveforms. [8]
- b) Explain Phase diagrams and signal constellations diagrams of QPSK. [8]
- Q11)** a) Design a 4-bit PN sequence generator and verify the properties of maximum length sequence. Assume that initial state is 1000. [8]
- b) What is the difference between multiplexing and multiple access techniques? Compare TDMA, FDMA and CDMA. [10]

OR

- Q12)** Write short notes on: [18]
- a) Binary symmetric channel.
 - b) Continuous and slotted ALOH.
 - c) Frequency Hopped Spread Spectrum.
 - d) DS-SS.

