

Total No. of Questions : 12]

SEAT No. :

P2918

[4958]-152

[Total No. of Pages : 3

T.E. (Electronics)
DATA COMMUNICATION
(2008 Course) (Semester - I)

Time : 3 Hours]

[Max. Marks : 100

Instructions:

- 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 auto correlation functions. State and explain any three properties of auto correlation function. **[8]**
- b) Explain various probability distribution functions. **[8]**

OR

- Q2)** a) With a suitable example explain what is random process. What is ensemble average & time average. **[8]**
- b) Explain different properties of CDF and PDF for discrete and continuous random variables. **[8]**

- Q3)** a) For the sequence 10111010, sketch the waveform using the following data formats:

- | | |
|-------------------------------|------------------------------------|
| 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. **[10]**

P.T.O.

- b) Explain meaning of intersymbol interference. What is the cause behind?[6]

OR

- Q4)** a) Why synchronization is necessary in data communication? Explain bit and frame synchronization using suitable sketch. [8]

- b) Explain Multi level schemes: 2B1Q, 8B16, MLT-3 and their comparison.[8]

- Q5)** a) What is entropy? For a discrete memory less source what is the upperbound on entropy. [10]

Show that equiprobable messages results to maximum entropy.

- b) Explain in detail free distance and coding gain. [8]

OR

- Q6)** Writes Short Notes on. [18]

- a) Continuous random variables.
- b) Frame synchronization techniques.
- c) Convolution code.

SECTION - II

- Q7)** a) State and explain properties of mutual information. [8]

- b) Explain ARQ techniques. [8]

OR

- Q8)** a) Obtain generator matrix and parity check matrix for (7,3) systematic cyclic code verify the result with syndrome. [10]

- b) Explain Shanon- Fano coding with example. [6]

Q9) a) Explain the transmission and reception of QPSK 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 50 MHz. Find the symbol rate of transmission and band width requirement of the channel in the following cases.

i) FSK

ii) QPSK

[8]

OR

Q10)a) Explain the necessity of continuous MSK. State and explain the basic principles of QAM with block schematic and suitable waveforms. **[8]**

b) Explain Phase diagrams and signal constellations diagrams of ASK. **[8]**

Q11)a) Design a 4-bit PN sequence generator and verify the properties of maximum length sequence. Assume that initial state is 10000. **[8]**

b) Explain Slow and Fast Frequency Hopped Spread Spectrum. **[10]**

OR

Q12)Writes Short Notes on. **[18]**

a) Noiseless and Lossless channel.

b) CSMA.

c) DSSS.

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