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M. Tech 1st Semester Examination

Design of Advanced Digital Communication Systems

EC-104

Time : 3 Hours   **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt any five questions.

1. (a) Describe the process of symbol timing estimation in digital communication system. Explain maximum likely-hood timing estimation process.   (10)

    (b) Describe continuous phase modulation (CPM). Show that it is a non-linear modulation method with memory. (10)

2. (a) Derive an expression for PSD of CPFSK signals.   (10)

    (b) Derive an expression for S/N ratio of a matched filter receiver.   (10)

3. (a) What is a spread spectrum communication system? Describe FHSS in details.   (10)

    (b) Describe the process of maximum likelihood carrier phase detection.   (10)

4. (a) Evaluate the effect of additive noise on phase estimation of the carrier.   (10)

    (b) Describe how phase estimation of carrier is carried out using non-decision directed loops.   (10)

5. (a) Derive an expression for capacity of non-ideal linear filter channel. (10)

   (b) Describe the transmitter and receiver used for OFDM. Explain why cyclic prefix is used in OFDM. (10)

6. (a) Derive an equation for bandwidth requirement and minimum distance between signal space points in case of M-array orthogonal signals. (1

   (b) Describe DSSS communication system in details. What are advantages of DSSS system over conventional communication systems? (10)

7. (a) Describe the correlation receiver used in digital signal demodulation, deriving an expression for its S/N ratio. (10)

   (b) "The bandwidth of BFSK is two times the BW of BPSK" justify the statement by deriving PSD for the both. (10)

8. Write short note on of the following:

   (a) Signal space representation of signal.

   (b) CPFSK signaling scheme. (10×2=20)