

2054

B.E. (Electronics and Communication Engineering)

Eighth Semester

EC-809: Advanced Digital Communication

Time allowed: 3 Hours

Max. Marks: 50

*NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.*

*x-x-x*

I. Attempt the following:-

- a) What is a baseband signal?
- b) What do you mean by a modulation scheme with memory?
- c) What is the difference between bit error probability and symbol error probability?
- d) What do you mean by phase jitter?
- e) How are the effects of interchannel interference in OFDM systems reduced? (5x2)

**UNIT - I**

- II.
  - a) How is the low pass equivalent of bandpass signals generated?
  - b) What are orthonormal signals? How are they obtained? (2x5)
- III.
  - a) Obtain the PAM signal in terms of orthonormal basis functions and show its signal space diagrams for  $M=2,4,8$ .
  - b) How are CPM signals obtained? Show the pulse shapes for full response and partial response CPM signals. (2x5)
- IV.
  - a) Give the mathematical model for an AWGN vector channel. What are the optimal decision schemes?
  - b) Give the structure of a matched filter receiver with  $N$  correlators and explain its working. (2x5)

**UNIT - II**

- V.
  - a) How are band-limited channels characterized? What are some of the distortions a signal goes through in a channel?
  - b) How is the design of band-limited signals for no ISI carried out? What are the advantages of using raised cosine spectrum? (2x5)

P.T.O.



(2)

- VI. a) Explain the symbol-by-symbol data detection method for controlled ISI.  
b) With the help of a diagram, explain the linear transversal filter used in linear equalization. What are the criteria for optimizing the equalizer coefficients? (2x5)
- VII. What is an OFDM system? Explain the process of modulation and demodulation in OFDM systems. Illustrate the magnitude spectrum for adjacent subcarriers in such a system. What are the ramifications of the large spectral overlap? How are they overcome? (10)

x-x-x