Exam.Code:969
Sub. Code: 7338

1129

M.E. (Electronics and Communication Engineering)

First Semester

ECE-1103: Advanced Digital Communication

Time allowed: 3 Hours **Max. Marks: 50**

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

x-x-x

I. Attempt the following:-

a) What matched filter?

b) Draw constellation diagram of 16-QAM.

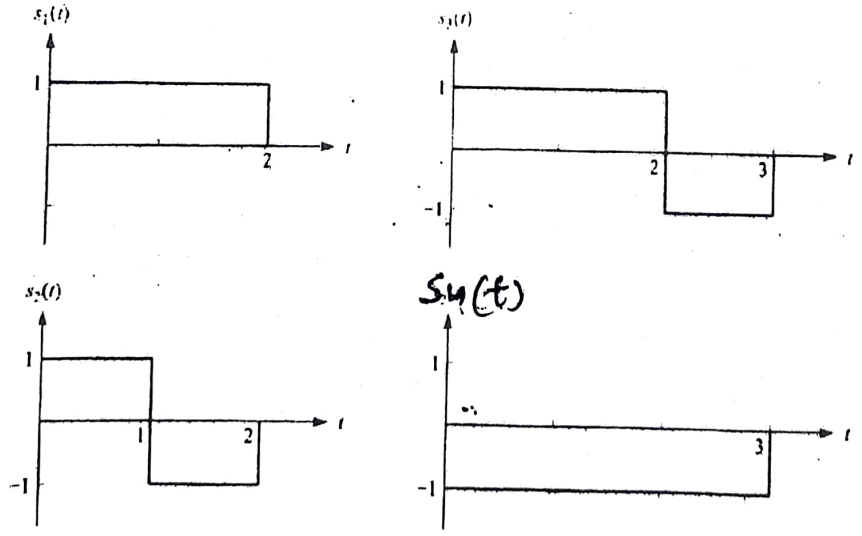
c) What is Phase Locked Loop?

d) What is fast and slow frequency hopping?

e) What is jamming margin? (5x2)

UNIT – I

II. a) State necessary conditions for any two signals to be orthonormal. Calculate orthonormal basis for the signals shown below using Gram Schmidt procedure of orthogonalization.



b) What is CPFSK? Explain its modulation process with the help of block diagram. (2x5)

P.T.O.

III. a) Consider two equiprobable message signals $S_1 = (0,0)$ and $S_2 = (1,1)$. The channel adds iid noise components n_1 and n_2 to the transmitted vector each with an exponential PDF of the form

$$p(n) = \begin{cases} e^{-n} & n \geq 0 \\ 0 & n < 0 \end{cases}$$

Calculate error probability if MAP detector is used.

b) What are signaling schemes with memory, explain their roles in digital communication. (2x5)

IV. a) What is an optimum receiver? How do we implement Optimum receiver using Correlation Receiver methods.

b) Give performance analysis for wire-line and radio communication system. (2x5)

UNIT – II

V. a) What is carrier phase estimation? Explain maximum likelihood carrier phase estimation.

b) What is maximum likelihood timing estimation? Explain decision directed timing estimation. (2x5)

VI. What is OFDM? Explain modulation and demodulation process in an OFDM system. Why IFFT is carried out at in modulation and FFT is implemented in demodulation of OFDM system? (10)

VII. a) Give spectral characteristics of multicarrier signals & briefly explain Bit and Power allocation in multicarrier modulation.

b) What are necessary conditions for spread spectrum system? How synchronization is achieved in direct sequence spread spectrum systems? (2x5)

x-x-x