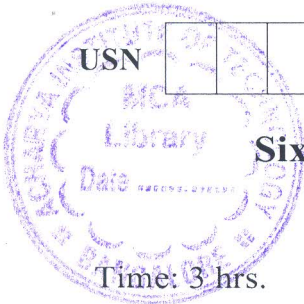


CBCS SCHEME

18EC61



Sixth Semester B.E. Degree Examination, Jan./Feb. 2023 Digital Communication

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain Hilbert transform and its properties. (10 Marks)
- b. Derive the expression for the complex low pass representation of band pass system. (10 Marks)

OR

- 2 a. Describe the canonical representation of Band-pass signal. (10 Marks)
- b. Find out the hibert transform of
 - i) $g(t) = \cos 2\pi Ft + \sin 2\pi Ft$
 - ii) $g(t) = e^{-j2\pi Ft}$ (04 Marks)
- c. Sketch the line code for the binary sequence 10110011
 - i) Unipolar NRZ (06 Marks)
 - ii) Unipolar RZ
 - iii) Manchester coding.

Module-2

- 3 a. Describe the geometric representation of signals. Also show that energy of the signal is equal to squared length of the vector representing it. (10 Marks)
- b. Find out the expression of mean, variance and covariance of correlator outputs. (10 Marks)

OR

- 4 a. Explain the correlation receiver and matched filter receiver with relevant diagrams. (10 Marks)
- b. Apply Gram-Schmidt procedure to obtain an orthonormal basis for the signals $s_1(t)$, $s_2(t)$ and $s_3(t)$ as shown in Fig.Q.4(b). Write $s_1(t)$, $s_2(t)$ and $s_3(t)$ interms of orthonormal basis function.

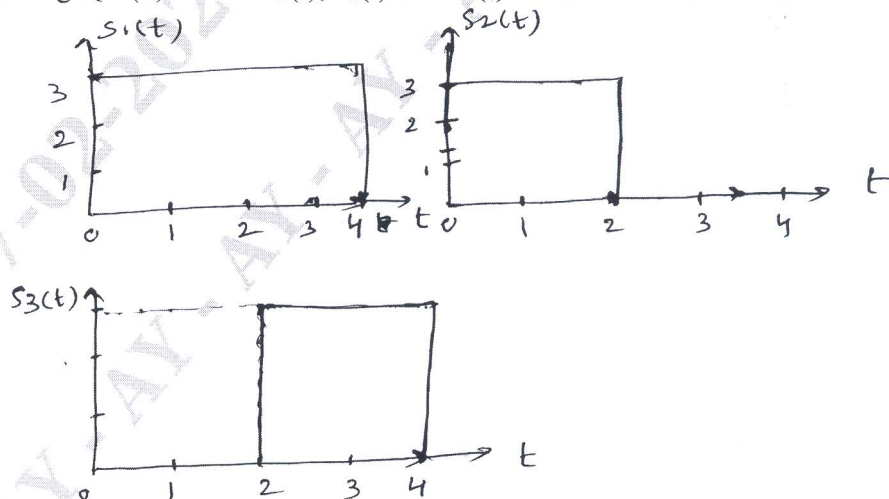


Fig.Q.4(b)

(10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-3

- 5 a. Describe with neat diagram the generation and detection of BPSK. Also derive the probability of error for coherent detection. (10 Marks)
- b. Using block diagram, explain the generation and detection of QPSK signal. (10 Marks)

OR

- 6 a. Derive the expression for average probability of error for FSK using coherent detection. Explain transmitter and coherent receiver of FSK. (10 Marks)
- b. Explain with block diagram the non-coherent detection of FSK signals. (06 Marks)
- c. Encode the binary sequence using DPSK 11011011. Assume reference bit as '1'. (04 Marks)

Module-4

- 7 a. Explain the digital PAM transmission system. Also derive the expression for Inter Symbol Interference (ISI). (10 Marks)
- b. Illustrate the due-binary and modified duo-binary signals in time-domain and frequency domain. (10 Marks)

OR

- 8 a. Describe the Nyquist criterion for distortion less base band binary transmission and find out the ideal solution for zero-ISI. (10 Marks)
- b. The input to the preorder is a binary sequence 1 0 0 1 0 1 1 0 0. Obtain the preceded sequence, transmitted amplitude levels, the received signal levels and the decoded sequence for due-binary system. (06 Marks)
- c. Write short note on-eye diagram. (04 Marks)

Module-5

- 9 a. Illustrate the working of Direct-sequence spread spectrum transmitter and receiver with block diagram, waveforms and expression. (10 Marks)
- b. Explain frequency hop spread spectrum system with neat block diagram. (10 Marks)

OR

- 10 a. Illustrate the CDMA system forward link base on IS-95. (10 Marks)
- b. Write note on application of spread spectrum in wireless LAN's. (04 Marks)
- c. Obtain the PN sequence from the given PN sequence generator, assume 100 is a initial state. (06 Marks)

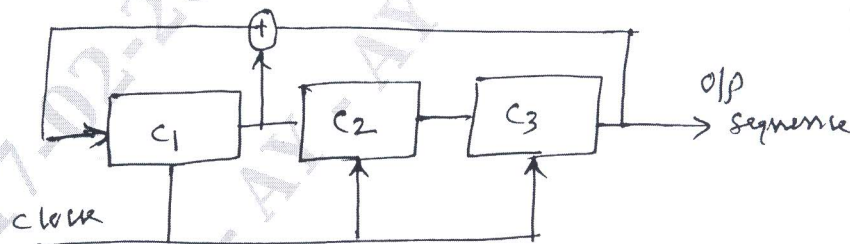


Fig.Q.10(c)
