CBCS SCHEME

USN | | | | | | | | | | |

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 ii) Unipolar RZ iii) Manchester coding. **(06 Marks)**

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.

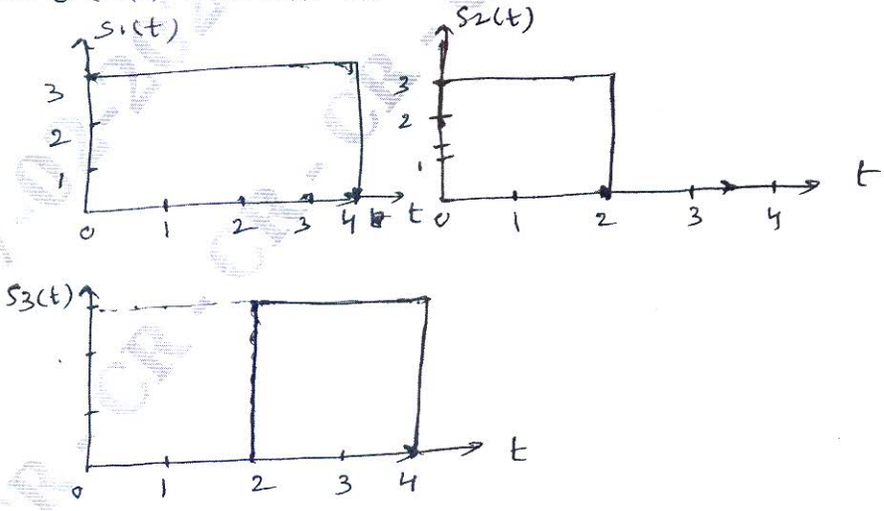

Fig.Q.4(b) **(10 Marks)**

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)**

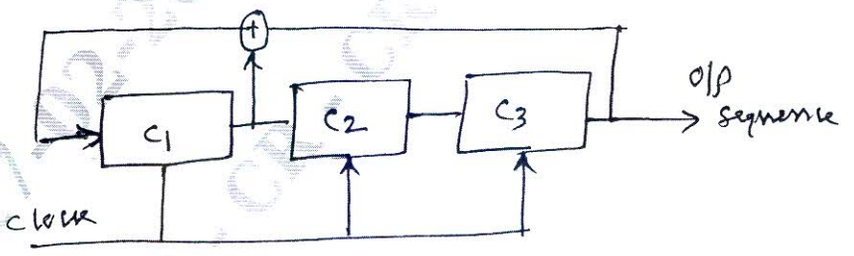

Fig.Q.10(c)

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