CBCS SCHEME

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

18EC61

Sixth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Digital Communication

Time: 3 hrs. Max. Marks: 100

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

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-1

1 a. Define HT. State and prove the properties. Mention its applications. **(10 Marks)**

b. Define signaling format. Sketch the following format using data stream as 111000110:
(i) Unipolar RZ (ii) Unipolar NRZ (iii) Polar NRZ
(iv) AMI (v) Manchester NRZ **(06 Marks)**

c. Describe the overview of HDB3 format. **(04 Marks)**

OR

2 a. Explain the pre-envelope of a band pass signals. **(07 Marks)**

b. Explain complex low pass representation of band pass systems. **(07 Marks)**

c. Explain canonical representation of band pass signals. **(06 Marks)**

Module-2

3 a. Explain the Gram-Schmidt orthogonalization procedure. **(08 Marks)**

b. Explain the geometric representation of signals and express the energy of signal interms of the signal vector. **(12 Marks)**

OR

4 a. Explain the matched filter receiver with the neat sketches and mathematical equations. **(08 Marks)**

b. Explain conversion of continuous AWGN channel into a vector channel. **(07 Marks)**

c. Describe the complex envelope of a band pass signal. **(05 Marks)**

Module-3

5 a. Define PSK. Derive the probability of error of BPSK. **(10 Marks)**

b. Describe the QPSK signal with signal space diagram. With a neat diagram, explain the generation and detection of QPSK signal. **(10 Marks)**

OR

6 a. Obtain the expression probability of symbol error of coherent FSK. **(10 Marks)**

b. Sketch the waveform of QPSK using 1100100001. **(05 Marks)**

c. Illustrate the operation of DPSK for the binary sequence 10010011. **(05 Marks)**

Module-4

7 a. With a neat diagram, explain the digital PAM transmission through band limited channels. **(08 Marks)**

b. Explain signal design for band limited signals with controlled ISI (partial response signals). **(12 Marks)**

OR

8 a. With a suitable diagram, explain adaptive equalizing filter. **(10 Marks)**

b. Describe signal design for band limited channels with zero ISI. **(10 Marks)**

Module-5

9 a. With a neat sketch, explain direct sequence spread spectrum. **(10 Marks)**

b. Briefly explain the four applications of DS spread spectrum signals. **(10 Marks)**

OR

10 a. With a suitable diagram, explain forward and reverse link of CDMA based IS-95. **(12 Marks)**

b. A DSSS signal is designed so that the power ratio P_R/P_N at the intended receiver is 10^{-2}. If the desired $E_b/N_o = 10$ for acceptable performance, determine the minimum value of its processing gain. **(03 Marks)**

c. Illustrate slow frequency hopping. **(05 Marks)**

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