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Register No: ………………………………..   Name: …………………………………………………………

SAINTGITS COLLEGE OF ENGINEERING
KOTTAYAM, KERALA
(AN AUTONOMOUS COLLEGE AFFILIATED TO
APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

**FIRST SEMESTER M.TECH. DEGREE EXAMINATION (R), MARCH 2021
(TELECOMMUNICATION ENGINEERING)**

Course Code: 20ECTET105

Course Name: ADVANCED DIGITAL COMMUNICATION

Max. Marks: **60**   **Duration:**   **3 Hours**

PART A
*(Answer all questions. Each question carries 3 marks)*

1. Draw the signal space diagram of BPSK and PAM
2. Design a matched filter demodulator.
3. What is ISI. Write the Nyquist criterion for zero ISI
4. Explain multicarrier systems with block diagram.
5. Explain statistical model for fading channels.
6. Characterize fading multipath channels with an example.
7. Define jamming margin and derive the expression.
8. Differentiate DSSS and FHSS

PART B
(Answer one full question from each module, each question carries 6 marks)
MODULE I
9. Determine a set of orthonormal functions for the signals shown in the figure.

(6)

OR
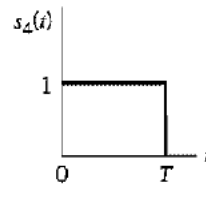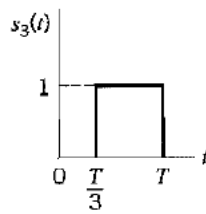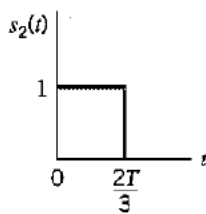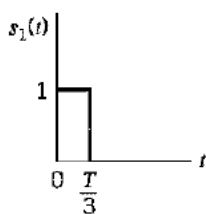
10. Derive the expressions for the equivalent representation of band pass signal (6)

MODULE II

11. Derive the probability of error for M-ary orthogonal signals (6)

OR

12. Design an optimum detector for an AWGN channel (6)

MODULE III

13. Enumerate decision feedback equalization in detail. (6)

OR

14. Design an optimum receiver for channels with ISI and AWGN (6)

MODULE IV

15. Discuss multicarrier modulation with overlapping sub channels. (6)

OR

16. Illustrate mitigation of subcarrier fading. (6)

MODULE V

17. Explain the propagation model for mobile radio channels. (6)

OR

18. Explain the effect of signal characteristics on the choice of a channel model. (6)

MODULE VI

19. In a direct sequence BPSK system, the feedback shift register used to generate the PN sequence has length $m = 19$. The system is required to have an average probability of symbol error due to externally generated interfering signals that does not exceed 10^{-5}. Calculate a) Processing gain b) Jamming margin (in decibel). (6)

OR

20. Explain Frequency hopping spread spectrum in detail. (6)

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