

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIRST SEMESTER M.TECH DEGREE EXAMINATION (Regular), FEBRUARY 2022*(Telecommunication Engineering)***(2021 Scheme)****Course Code : 21TE103****Course Name: Advanced Digital Communication****Max. Marks : 60****Duration: 3 Hours****PART A***(Answer all questions. Each question carries 3 marks)*

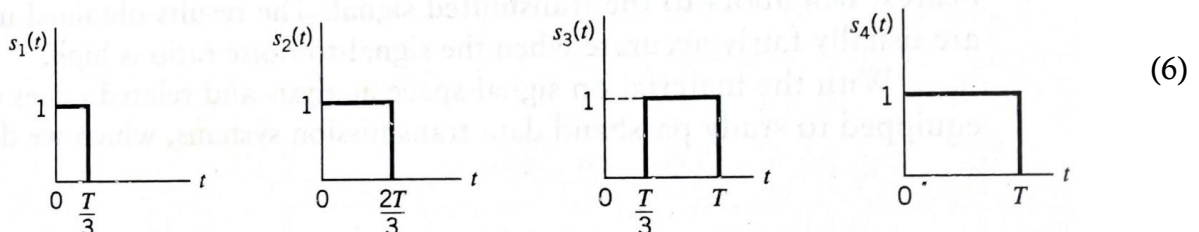
1. Explain the concept of signal space representation.
2. Describe correlation demodulator.
3. Explain decision feedback equalization.
4. Discuss multicarrier transmitter with block diagram.
5. Differentiate frequency selective and frequency non selective channels.
6. Write notes on coherence bandwidth.
7. Differentiate microscopic fading and macroscopic fading in space time propagation.
8. Analyze the features of MISO and SIMO channels.

PART B*(Answer one full question from each module, each question carries 6 marks)***MODULE I**

9. Derive the expression for the equivalent representation of band pass signal. (6)

OR

10. Using Gram Schmidt Orthogonalization procedure, find a set of orthonormal basis functions to represent the given four signals.

**MODULE II**

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

OR

12. Explain matched filter demodulator in detail. (6)

MODULE III

13. Illustrate maximum likelihood optimum receiver for an AWGN channel with ISI. (6)

OR

14. State and prove Nyquist pulse shaping criteria. (6)

MODULE IV

15. Consider a multicarrier system with a total passband bandwidth of 1 MHz. Suppose the system operates in a city with channel delay spread $T_m = 20 \mu\text{s}$. How many sub channels are needed to obtain approximately flat fading in each sub channel? (6)

OR

16. Discuss mitigation of subcarrier fading in a multicarrier modulation system. (6)

MODULE V

17. Characterize fading multipath channels. (6)

OR

18. Explain briefly the characteristics of a frequency selective slowly fading channel. (6)

MODULE VI

19. Define the various space time channel models with illustrations. (6)

OR

20. Explain space time OFDM. (6)
