

**APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER**

Q. P. Code : CSP0818121-P

(Pages: 3)

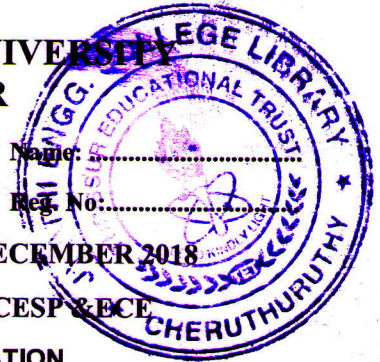
Name:

Reg. No:

FIRST SEMESTER M.TECH. DEGREE EXAMINATION DECEMBER 2018

Branch: Electronics and Communication Engineering Specialization: CESP & ECE

08EC6221/6521 ADVANCED DIGITAL COMMUNICATION



Time:3 hours

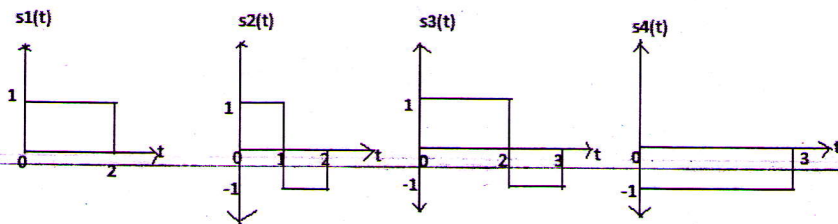
Max.marks: 60

Answer all six questions.

Modules 1 to 6:Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Q.no.	Module 1	Marks
1.a	State and prove Central Limit Theorem.	3
	Answer b or c	
b	Discuss in detail about Markov's inequality, Chebyshev's inequality and Chernoff Bound.	6
c	With examples explain Stationary process, Ergodic process and Gaussian process.	6

Q.no.	Module 2	Marks
2.a	Write a short note on Matched-filter and its properties.	3
	Answer b or c	
b	Determine a set of orthonormal functions for the 4 signals shown in fig.	6



- c Design an optimum receiver for the reception of signals corrupted by AWGN. 6

Q.no. Module 3 Marks

- 3.a Discuss about optimum receiver for M-ary orthogonal signals with proper illustration. 3

Answer b or c

- b Design an optimum receiver for binary signals with random phase in AWGN channel. 6
- c Derive the PER for envelope detection of M-ary orthogonal signals. 6

Q.no. Module 4 Marks

- 4.a Analyse the time varying impulse response of a multipath channel. 3

Answer b or c

- b Analyse the relationships among various channel correlation functions and power spectra of fading multipath channel. 6
- c The scattering function $S(\tau; \lambda)$ for a fading multipath channel is non-zero for the range of values $0 \leq \tau \leq 1$ ms and $-0.1 \text{ Hz} \leq \lambda \leq 0.1 \text{ Hz}$. Assume that the scattering function is uniform in the two variables. Give numerical values for the following parameters. 6
- (i) The multipath spread of the channel.
 - (ii) The Doppler spread of the channel.
 - (iii) Coherence time of the channel
 - (iv) Coherence Bandwidth of the channel

Q.no. Module 5 Marks

- 5.a Distinguish between Rayleigh and Rician channels. 4

Answer b or c

- b Analyze an optimum non coherent receiver in random amplitude channels. 8
- c Compare the performance of various digital modulation schemes over wireless channels 8

Q.no.	Module 6	Marks
6.a	Express mathematically the Nyquist's Criterion for pulse shaping to tackle Inter-Symbol Interference.	4

Answer b or c

- | | | |
|----------|---|----------|
| b | Explain in detail about partial response signals when controlled ISI is introduced. | 8 |
| c | Explain in detail about frequency and phase synchronization. | 8 |