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08 PALAKKAD CLUSTER

Q.P.Code:CSP0817121-K (Pages:3)

Reg.No.....

Name.....

FIRST SEMESTER M.TECH. DEGREE EXAMINATION DECEMBER 2017

08EC6221/08EC6521 ADVANCED DIGITAL COMMUNICATION

Branch: Electronics and Communication Engineering

(Common to CESP &ECE)

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

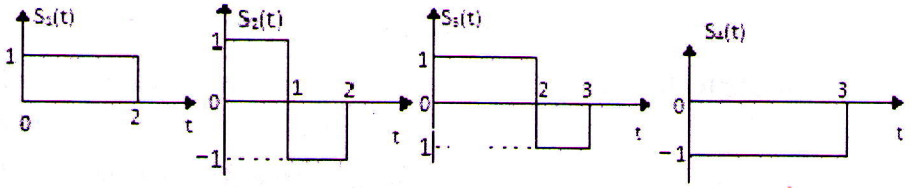
Answer all six questions. Part 'a' of each question is compulsory.

Answer either part 'b' or part 'c' of each question.

Q.no.1	Module 1	Marks
1.a	Define wide sense stationary processes.	3
	Answer b or c	
b	Use Chernoff bound to show that $Q(x) \leq e^{(-x^2/2)}$ Where Q(x) is defined by $Q(x) = \frac{1}{\sqrt{2\pi}} \int_x^\infty e^{-t^2/2} dt$	6
c	Discuss about central limit theorem and its importance with proper derivations.	6

Q.no.2	Module 2	Marks
2.a	Represent a bandpass signal in terms of its equivalent low pass signal, with proper equations.	3
	Answer b or c	
b	Define a matched filter demodulator and explain, how the filter maximizes the output signal to noise ratio.	6

c Apply Gram-Schmidt procedure to find the orthonormal basis functions for the following waveforms. 6



Q.no.3	Module 3	Marks
3.a	Define an optimum receiver.	3

Answer b or c

b Explain an optimum receiver for Binary signals. Consider the transmitted signals are orthogonal. 6

c Design a correlator demodulator and envelop detector for random phase signal reception in AWGN channel. 6

Q.no.4	Module 4	Marks
4.a	Explain the characterization of fading multipath channels.	3

Answer b or c

b The scattering function $S(\tau;\lambda)$ for fading multipath channel is nonzero 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 approximately uniform in two variables. Give numerical values for following parameters: 6

i) The multipath spread of the channel.
ii) The Doppler spread of the channel.
iii) The coherence time of the channel.
iv) The coherence bandwidth of the channel.
v) The spread factor of the channel.

c Explain the statistical model for fading channels. 6

Q.no.5	Module 5	Marks
5.a	Derive the MAP decision rule for Non-coherent receivers in random amplitude and phase channels.	4

Answer b or c

b	Derive the expression for Error probability of BPSK and QPSK modulation schemes.	**8**
c	Enumerate the performance of Non-coherent receivers in Rayleigh and Rician channels.	**8**

Q.no.6	**Module 6**	**Marks**
6.a	Discuss about Eye pattern of a bandlimited communication system	**4**

Answer b or c

b	Derive the expression for Nyquist criterion for zero ISI	**8**
c	Explain duobinary encoding technique with necessary block diagrams.	**8**