K.S. SCHOOL OF ENGINEERING AND MANAGEMENT, BANGALORE - 560109

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SESSION: 2021-2022 (EVEN SEMESTER)

I SESSIONAL TEST QUESTION PAPER

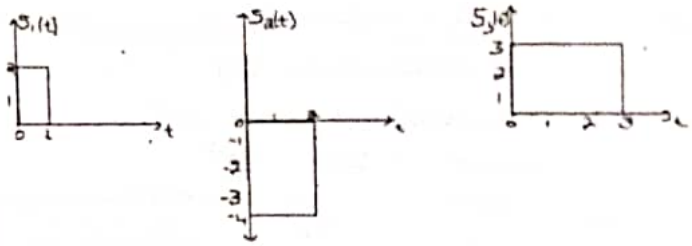
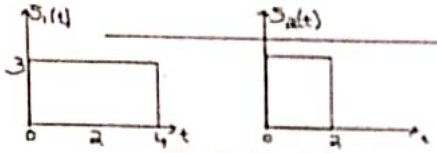
SET-A

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

Degree	: B.E	Semester	: VI
Branch	: Electronics & Communication Engineering	Date	: 16-05-2022
Course Title	: Digital Communication	Course Code	: 18EC61
Duration	: 90 Minutes	Max Marks	: 30

Note: Answer ONE full question from each part

Q. No.	Question	Marks	K Level	CO mapping
	PART-A			
1(a)	Define Hilbert Transform and explain the method of obtaining it using fourier transform.	5	Understanding (K2)	CO1
(b)	Determine Hilbert transform of signal x(t) = sinc(t).	5	Applying (K3)	CO1
(c)	Explain the geometric representation of set of M energy signals as linear combination of N orthonormal basis functions. Illustrate for the case of N=2 and M=3 with necessary diagrams and equations.	5	Understanding (K2)	CO2
	OR			
2(a)	Explain pre envelope and complex envelope of a signal s(t) with an example.	5	Understanding (K2)	CO1
(b)	Determine pre envelope , complex envelope of signal $x(t)= e^{-it}$	5	Applying (K3)	CO1
(c)	Explain the Gram Schmidt orthogonalization procedure.	5	Understanding (K2)	CO2
	PART-B			
3(a)	Explain canonical representation of band pass signal s(t). Also illustrate the scheme for deriving the in phase and quadrature components of the bandpass signal s(t).	5	Understanding (K2)	CO1
(b)	A binary data sequence is 011010. Sketch the following line codes: a) NRZ unipolar b) RZ polar c) NRZ bipolar d) Manchester e) RZ Unipolar	5	Remembering (K1)	CO1
(c)	Three Signals S1(t), S2(t) and S3(t) are shown in the figure-1. Apply Gram Schmidt orthogonalization procedure to determine orthonormal basis for	5	Applying (K3)	CO2

	the signals.  Figure 1			
	OR			
4(a)	With relevant expressions **explain** the procedure for computational analysis of a bandpass system driven by a bandpass signal.	5	**Understanding (K2)**	CO1
(b)	**Code** the pattern "10100000110000110000000" using HDB3 encoding, B3ZS and AMI encoding.	5	**Remembering (K1)**	CO1
(c)	Three Signals S1 (t), S2 (t) are shown in the figure-2. **Apply** Gram Schmidt orthogonalization procedure to obtain orthonormal basis for the signals. **Express** the signals S1 (t) and S2 (t) in terms of orthonormal basis function.  Figure 2	5	**Applying (K3)**	CO2

Course Incharge

HOD ECE
Professor & Head
Dept. of Electronics & Communication Engineering
K. S. School of Engineering & Management
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IQAC- Coordinator

Principal

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II SESSIONAL TEST QUESTION PAPER
Set B

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

Degree	:	**B.E**	**Semester**	:	**VI A & B**
Branch	:	**Electronics & Communication Engineering**	**Date**	:	**16-06-2022**
Course Title	:	**Digital Communication**	**Course Code**	:	**18EC61**
Duration	:	**90 Minutes**	**Max Marks**	:	**30**

Note: Answer ONE full question from each part.

Q. No.	Question	Marks	K Level	CO mapping
	PART-A			
1(a)	**Illustrate** how continuous AWGN channel converted into vector channel.	5	Understanding (K2)	CO2
(b)	With neat diagram and expressions, **explain** generation and coherent detection scheme of M ary QAM.	5	Understanding (K2)	CO3
(c)	Binary data is transmitted over AWGN channel using QPSK at a rate of 1Mbps and using carrier frequency of 100MHz. **Determine** the bandwidth required and symbol duration.	5	Applying (K3)	CO3
	OR			
2(a)	**Illustrate** maximum likelihood decision rule for signal detection problem.	5	Understanding (K2)	CO2
(b)	Using basis function define BFSK and **Explain** the signal space representation, generation and non-coherent detection of BFSK modulation.	5	Understanding (K2)	CO3
(c)	Draw the constellation diagram for M=4 ary QAM and **Obtain** an expression for probability of error of M ary QAM.	5	Applying (K3)	CO3
	PART-B			
3(a)	**Obtain** an expression for impulse response of matched filter.	5	Applying (K3)	CO2
(b)	**Derive** an expression for bandwidth efficiency. Comment on the bandwidth efficiency of M-ary PSK signals for different values of M.	5	Applying (K3)	CO3
(c)	**Explain** generation and detection of QPSK signal. For a given binary sequence 110101 draw the QPSK Waveform.	5	Understanding (K2)	CO3
	OR			
4(a)	Find the expression for mean and variance of correlator outputs $X_j=S_{ij}+N_j$. Also **show** that correlator outputs are statistically independent. Assume mean and variance of AWGN noise is zero and $N_o/2$.	5	Applying (K3)	CO2

(b)	Derive an expression for probability of error of Binary FSK system.	5	Applying (K3)	CO3
(c)	Explain generation and detection of DPSK signal. For a binary sequence given by 10111010, illustarte differential encoded sequence, transmitted phase, and decoded sequence.	5	Understanding (K2)	CO3

Course In charge

Head of the Department

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