USN :	1	D	S	1		E	C			

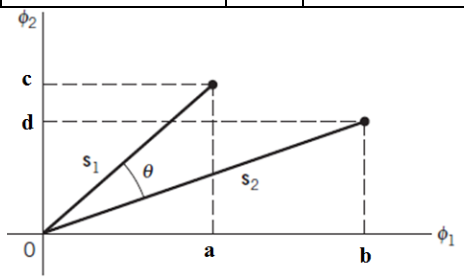
Dayananda Sagar College of Engineering

Shavige Malleshwara Hills, Kumaraswamy Layout, Banashankari, Bangalore-560078, Karnataka
Tel : +91 80 26662226 26661104 Extn : 2731 Fax : +90 80 2666 0789
Web - http://www.dayanandasagar.edu Email : hod-ece@dayanandasagar.edu
(An Autonomous Institute Affiliated to VTU, Approved by AICTE & ISO 9001:2008 Certified)
(Accredited by National Assessment & Accreditation Council (NAAC) with 'A' grade)

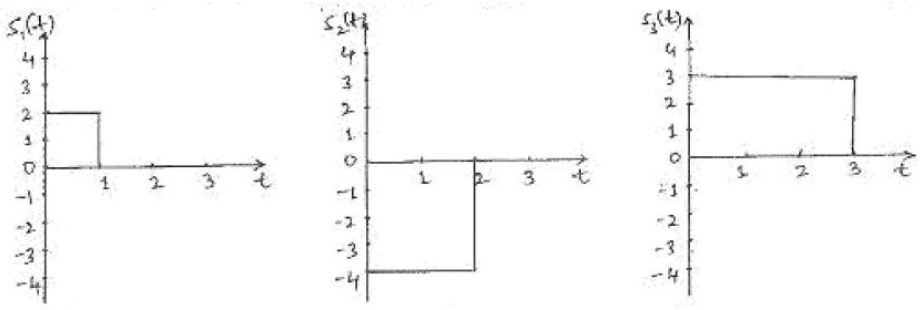
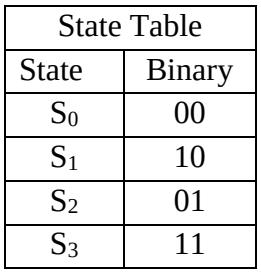
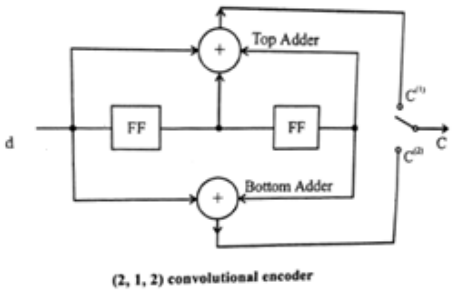
Department of Electronics & Communication Engineering

IAT – II

Course Name : Digital Communication	Date :	10/11/2020
Course Code : 18EC5DCDCS	Day :	Tuesday
Semester : 5	Timings :	9.30 AM
Max Marks : 50 M	Duration :	1½ Hrs.

No.		Question Description								Mar -ks	CO & Levels
1	(a)	The feedback shift register circuit in cyclic code is called as…..								1	
		i)	Multiplying circuit	ii)	Dividing circuit	iii)	Feedback circuit	iv)	Shifting circuit		
	(b)	In dividing circuit of cyclic codes, the parity polynomial is obtained by the …… Polynomial								1	
		i)	Remainder	ii)	Message	iii)	Code	iv)	None		
	(c)	The number of impulse response in (3,1,3) convolutional encodes is …								1	
		i)	1	ii)	2	iii)	3	iv)	4		
	(d)	For a (3,1,2) convolutional code with 4 message bits, the number of columns of a generator matrix are….								1	
		i)	18	ii)	20	iii)	22	iv)	24		
	(e)	Convolutional code depends only on …… input								1	
		i)	Present	ii)	Past	iii)	Present & Past	iv)	Future		
	(f)	While decoding the cyclic code, if the received code word is similar as transmitted code word, then r(x) mod g(x) is equal to _____								1	
		i)	Zero	ii)	Unity	iii)	Infinity	iv)	None		
	(g)	The representation of convolution encoder can be done using…….								1	
		i)	Connection pictorial	ii)	State diagram	iii)	Tree diagram	iv)	All of these		
	(h)	The number of dimensions in constellation diagram equals on ……								1	
		i)	Input signals	ii)	Basis Function	iii)	Output signals	iv)	None		
	(i)	The two modes of operation the adaptive equalizer……. and …….								1	
		i)	Training period, Decision directed mode	ii)	Training period, Testing mode	iii)	Initial mode, Final mode	iv)	None		
	(j)	In the geometric representation of signals, the a**, b, c, d** projections indicate…. respectively. 								1	
		i)	S11,S12, S21,S22	ii)	S11,S21, S12,S22	iii)	S12,S21 S11,S22,	iv)	S11,S22, S21,S12		

Note: Show all calculation steps

2		Consider the (3,1,2) convolutional code with $g^{(1)}$=(1 1 0),$g^{(2)}$=(1 0 1) & $g^{(3)}$=(1 1 1) i) Draw the encoder block diagram. ii) Determine the code word for the message sequence (the last two digit of your USN (as Hexadecimal-8 bit)) using time domain and Transfer domain approach. Ex: 1DS18EC057- consider $(57)_{16}$ – convert to binary (8 bits). Those who are having 00 as last two digits, consider message sequence as $(DC)_{16}$	10	CO2/ L3
3		Using Gram Schmidt orthogonalization procedure, determine a set of orthonormal basis functions to represent the 3 signals $S_1(t)$, $S_2(t)$, $S_3(t)$ as shown in the Fig. 3 below. i) Express each of these signals in terms of the set of basis function ii) Express each of these signals in terms of equations using the set of basis functions found in part(i)  Fig. 3	10	CO3/ L4
4		The generator polynomial for a (7, 4) binary cyclic code is g(x) = 1 + x + x3. Determine the code vector in Non-systematic and Systematic form for the last digit of your USN (as Hexadecimal-4bit, if you are having 00 as last two digits, consider message sequence as $(C)_{16}$). Construct the block diagram of encoder and examine the result by showing the status of the shift register for the systematic code.	10	CO2/ L4
		OR		
5		For the convolution encoder shown in Fig 2, draw the state transition table, State diagram and corresponding code tree. Using the code tree, find the encoded sequence for the message d= (the last two digit of your USN (as Hexadecimal-8 bit). Those who are having 00 as last two digits, consider message sequence as $(DC)_{16}$)  State Table State | Binary S_0 | 00 S_1 | 10 S_2 | 01 S_3 | 11  (2, 1, 2) convolutional encoder Fig. 2	10	CO2/ L4
6		Enlighten on ISI and Eye diagram.	10	CO3/ L2
		OR		
7		Illustrate the concept of matched filter and its properties.	10	CO3/ L2