
	<p align="center">Dayananda Sagar College of Engineering Shavige Malleshwara Hills, Kumaraswamy Layout, Banashankari, Bangalore-560078, Karnataka Tel : +91 80 26662226 26661104 Extn : 2731 Fax : +90 80 26660789 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)</p>	
Department of Electronics & Communication Engineering IAT – III		
Course Name : Digital Communication		Date : 05/01/2021
Course Code : 18EC5DCDCS		Day : Tuesday
Semester : 5		Timings : 09.30 a.m– 11.00 a.m
Max Marks : 50 M		Duration : 1½ Hrs.

Sl. No.	Question Description								Mar-ks	CO& Levels
1	(a)	Which of the following signals have constant envelope?							1	
	i)	ASK	ii)	PSK	iii)	Both (i) & (ii)	iv)	None of the mentioned		
	(b)	A pair of sinusoidal waves are called as 'antipodal signals', if they differ only in a relative phase-shift of.....degrees?							1	
	i)	45	ii)	90	iii)	180	iv)	Both (i) & (iii)		
	(c)	Which of the following digital modulation techniques is more sensitive to lack of coherence?							1	
	i)	ASK	ii)	PSK	iii)	FSK	iv)	None of the mentioned		
	(d)	Consider the below statements .Which among them represents the precise condition? A. The error rate of all digital modulation techniques decrease monotonically with decreasing values of E_b/N_0 B. A signal constellation refers to a set of possible message points.							1	
	i)	A is true, B is false	ii)	A is false, B is true	iii)	Both A & B are true	iv)	Both A & B are false		
	(e)	In M-ary QAM modulation scheme, carrier experiences .....as well as .....modulation?							1	
	i)	Amplitude and phase	ii)	Amplitude and frequency	iii)	Phase and frequency	iv)	None of the mentioned		
	(f)	Which of the following is not a property of spread spectrum techniques?							1	
	i)	Interference rejection capability	ii)	Multiple access interface	iii)	Multipath rejection	iv)	Small transmission bandwidth		
	(g)	DSSS system spreads the baseband signal by .....the baseband pulses with a pseudo noise sequence.							1	
	i)	Adding	ii)	Subtracting	iii)	Multiplying	iv)	Dividing		
	(h)	In maximum-length sequence generator, the degree of generator polynomial is equal to.....?							1	
	i)	N	ii)	2^m-1	iii)	M	iv)	None of the mentioned		
	(i)	Processing gain of DSSS communication system which uses 4 bit length shift register for generating ML sequence is.....?							1	
	i)	4	ii)	15	iii)	16	iv)	None of the mentioned		

	(j)	Consider the below statements .Which among them represents the precise condition? A. CDMA requires an external synchronization circuit like TDMA. B. In slow frequency hoping, symbol rate is greater than hop rate.						1		
		i)	A is true, B is false	ii)	A is false, B is true	iii)	Both A & B are true			iv)	Both A & B are false
Note: Show all calculation steps										
2		Sketch the waveforms of QPSK, DPSK (both EX-OR and EX-NOR) for the input message sequence as explained below. Input Message: Consider the last but one character of your name as mentioned in the Marks card (Uppercase)(Don't consider initials)– Consider ASCII value(HEX) of the character- 8 bit.(Refer the ASCII chart in page number 3. Ex: DAYANANDA SAGAR- consider last but one character (A) ASCII for 'A' : (41) ₁₆ - 01000001 Note: <ul style="list-style-type: none">For DPSK, take the last bit of above message as initial bitMention the signal representation of single and dibits for each case.						10	CO4/ L1	
3		In a Slow FH/MFSK system and Fast FH/MFSK system, the signal has the following parameters: Number of bits per MFSK Symbol: K=2 Number of MFSK tones : M=4. Length of PN Segment per hop : k=3, Total number of frequency hops : 8 i) Sketch the frequency variation of the transmitted signal with time. Assume input binary sequence to be as mentioned in the example below and one period of PN sequence is 001110011001001 ii) Sketch the dehopped MFSK signal Input binary message: Consider the last three digits of your USN (as hexadecimal- 12 bit) and take 1's complement of the data. Ex: 1DS18EC025- (025) ₁₆ – 000000100101- 111111011010 (Input binary message)						10	CO5/ L1	
4		Illustrate the working principle of PSK with the help of block diagram and support the concept with necessary waveforms for the input sequence as mentioned in Question 2 . Derive Probability of error for the same.						10	CO4/ L2	
		OR								
5		Illustrate the working principle of FSK with the help of block diagram and support the concept with necessary waveforms for the input sequence as mentioned in Question 2 . Derive Probability of error for the same.						10	CO4/L2	
6		Emphasize the significance of Pseudo-Noise sequences and verify properties with an example. List the applications of Spread spectrum modulation.						10	CO5/ L1	
		OR								
7		Briefly discuss the idealized model of baseband spread-spectrum system, along with necessary equations and waveforms. Extend the concept to achieve DSSS.						10	CO5/ L2	

ASCII Table

Dec	Hex	Oct	Char	Dec	Hex	Oct	Char	Dec	Hex	Oct	Char	Dec	Hex	Oct	Char
0	0	0		32	20	40	[space]	64	40	100	@	96	60	140	`
1	1	1		33	21	41	!	65	41	101	A	97	61	141	a
2	2	2		34	22	42	"	66	42	102	B	98	62	142	b
3	3	3		35	23	43	#	67	43	103	C	99	63	143	c
4	4	4		36	24	44	\$	68	44	104	D	100	64	144	d
5	5	5		37	25	45	%	69	45	105	E	101	65	145	e
6	6	6		38	26	46	&	70	46	106	F	102	66	146	f
7	7	7		39	27	47	'	71	47	107	G	103	67	147	g
8	8	10		40	28	50	(	72	48	110	H	104	68	150	h
9	9	11		41	29	51	)	73	49	111	I	105	69	151	i
10	A	12		42	2A	52	*	74	4A	112	J	106	6A	152	j
11	B	13		43	2B	53	+	75	4B	113	K	107	6B	153	k
12	C	14		44	2C	54	,	76	4C	114	L	108	6C	154	l
13	D	15		45	2D	55	-	77	4D	115	M	109	6D	155	m
14	E	16		46	2E	56	.	78	4E	116	N	110	6E	156	n
15	F	17		47	2F	57	/	79	4F	117	O	111	6F	157	o
16	10	20		48	30	60	0	80	50	120	P	112	70	160	p
17	11	21		49	31	61	1	81	51	121	Q	113	71	161	q
18	12	22		50	32	62	2	82	52	122	R	114	72	162	r
19	13	23		51	33	63	3	83	53	123	S	115	73	163	s
20	14	24		52	34	64	4	84	54	124	T	116	74	164	t
21	15	25		53	35	65	5	85	55	125	U	117	75	165	u
22	16	26		54	36	66	6	86	56	126	V	118	76	166	v
23	17	27		55	37	67	7	87	57	127	W	119	77	167	w
24	18	30		56	38	70	8	88	58	130	X	120	78	170	x
25	19	31		57	39	71	9	89	59	131	Y	121	79	171	y
26	1A	32		58	3A	72	:	90	5A	132	Z	122	7A	172	z
27	1B	33		59	3B	73	;	91	5B	133	[	123	7B	173	{
28	1C	34		60	3C	74	<	92	5C	134	\	124	7C	174	|
29	1D	35		61	3D	75	=	93	5D	135	]	125	7D	175	}
30	1E	36		62	3E	76	>	94	5E	136	^	126	7E	176	~
31	1F	37		63	3F	77	?	95	5F	137	_	127	7F	177	