

## ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE - 2007 PRINCIPLES OF COMMUNICATION ENGINEERING

SEMESTER - 4

Time	e : 3 I	Hours		[ Full Marks : 70
			Group - A	
			( Multiple Choice Type Questions )	
1.	Cho	ose th	e correct alternatives for the following:	
1				$10\times1=10$
	1)	. In P	CM, the biggest advantage as compared to AM is	
		a)	larger bandwidth	
•		b)	larger noise	
		<b>c</b> )	inability to handle analog signals	
	•	d)	incompatibility with time division multiplexed system.	
<b>.</b>	ii)	The	saving in power in a DSB-SC system, modulated at 80% is	
		a)	NIL b) 80%	
	* :	<b>c</b> )	75·76% d) 50%.	
	111)	In t	he spectrum of FM	
		a)	the carrier frequency disappears when the modulation in	dex is large
	**	b)	the amplitude of any sideband depends on modulation in	dex
	**	<b>c</b> )	the total number of sidebands depends on modulation in	dex
		d)	carrier frequency cannot disappear.	
	iv)	The	difference between PM and FM	
		a)	is purely theoretical as they are same in practice	
	٠.	b)	is too great to make the two systems compatible	
		c)	lies in the poorer audio response of phase modulation	
		d)	lies in the different definition of modulation index.	

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v)	In T	V telecast, the sound st	gnal is modulate	d in	7 <b>W</b>
	a)	SSB	<b>b</b> )	VSB	i i
	c)	FM	d)	AM.	
vi)	The	intermediate frequency	used for a supe	erheterodyne AM receiver is	
	a)	455 kHz	<b>b</b> )	755 kHz	
	<b>c</b> )	545 kHz	d)	745 kHz.	
vii)	Whi	ch one is a digital modu	ulating scheme?		
	a)	PCM	<b>b</b> )	PAM	
	c)	РРМ	d)	PWM.	
viii)	If th	e number of bits in PC	M code word is t	ncreased from 7 bit to 8 bit,	the SNR
	a)	is increased	<b>b)</b>	is decreased	
	c)	remains constant	<b>d</b> )	cannot be determined.	
ix)	If th	e number of bits in PC	M code word is i	ncreased from 7 bit to 8 bit t	he SNR
•	a)	increases by 10 dB	<b>b</b> )	decreases by 10 dB	•
	c)	increases by 6 dB	d)	increases by 8 dB	
x)	If th	e SNR of the signal is in	ncreased, then th	ne channel capacity	
	a)	is increased	<b>b</b> )	is decreased	
	а) С)	remains constant	d)	cannot be determined.	·
	<b>C,</b>				
•			Group - B		•
			nswer Type Que		
		Answe	r any three quest	nons. 3	× 5 = 15
How	can l	balanced modulator be	used to generate	a DSB-SC signal?	

2.

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Distinguish between PAM, PWM and PPM.

6.



- 4. What are up-link and down-link? Why is the up-frequency higher than down-link?
- 5. A standard AM transmission, sinusoidally modulated to a depth of 30% produces side frequencies of 4.928 and 4.914 MHz. The amplitude of each side frequency is 75 V.

  Determine the amplitude and frequency of the carrier.
  - What is the function of MODEM? Explain.

		Group - C	
•		(Long Answer Type Questions)	
		Answer any three questions. $3 \times 15 =$	45
•	a)	Show that for wideband FM, the bandwidth requirement is given by	
		BFM $\cong$ 2B (1 + 2 $\beta$ ) where the symbols have their usual significance.	4
	b)	Discuss about the roles of pre-emphasis and de-emphasis circuits in	ĖΜ
		Broadcasting.	4
	<b>c</b> )	Explain how PLL can be used as an FM demodulator.	5
	d)	Write down the advantages of FM over AM.	2
). 	a)	Draw the block diagram of a superheterodyne receiver and explain the function	ion
		of each block.	6
	b)	In a broadcast superheterodyne receiver having no RF amplifier, the loaded Q	
		the antenna coupling circuit is 100. If the intermediate frequency is 455 kl	Hz,
		calculate image frequency and its rejection ratio	
		i) at 1000 kHz	
•		ii) at 25 MHz.	4
	c)	Draw a diagram of a D/A converter and explain its working principle.	5
•	a)	Write the advantages of digital communication over analog communication.	3
÷	b)	What is BFSK? Draw and explain how BFSK is non-coherently detected.	5
	<b>c</b> )	What do you mean by channel capacity? Calculate the capacity of an AGV	٧N
		channel with a bandwidth of 1 MHz and SNR of 40 dB.	5
	d)	Write the negative statements of Shannon's theorem.	2.



10.	a)	What is the Shannon-Hartley theorem for channel capacity?
•	<b>b</b> )	Represent the Block Codes in Matrix form.
; ;	c)	A Gaussian channel has 1 MHz bandwidth. Calculate the channel capacity if the
		signal power to noise spectral density ratio ( $S/\eta$ ) is 10 $^5$ Hz. Also find the
		maximum information rate.
11.	a)	With the help of a block diagram, explain the working principles of coherent ASK
		generation and detection principles.
	<b>b</b> )	Compare between ASK, FSK and PSK. 5
	c)	Sketch the binary waveform for the following bit sequence:  4
		110101001