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ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE - 2007 ANALOG COMMUNICATION

SEMESTER - 4

Time	: 3 I	lours	1		-		[Full Marks : 70
				Group -	A		
	1 · •		(Mul	tiple Choice Ty	pe Que	stions)	
1.	Cho	ose th	e correct alternati	ives for any ten	of the fo	ollowing:	$10\times1=10$
	i)	The	communication m	nedium causes tl	ne signa	ıl to be	
•		a)	amplified		b)	modulated	
		c)	attenuated		d)	interfered with.	
	ii)	The	saving in power in	n a DSBSC syste	m mod	ulated at 80% is	
		a)	NI		b)	80%	
		c)	75.76%		d)	50%.	
	iii)	A 1	MHz carrier is am	plitude modulat	ed by a	symmetrical squa	re wave of period
		100	per sec. Which	of the following	g frequ	encies will not be	e present in the
		mod	ulated signal?				
		a)	990 kHz		b)	1010 kHz .	
		c)	1020 kHz		d)	1030 kHz.	
\$ 1	iv)	A su	iperheterodýne r	eceiver with ar	IF of	450 kHz is tune	d to a signal of
. 6		1200	kHz. The image	frequency is			
* .		a)	750 kHz	ing sa	b)	900 kHz	
	•	c)	1650 kHz		d)	2100 kHz.	
	v)	The	theoretical bandw	ridth of FM signa	ıl is		
	et.	a)	infinity		b)	$2f_m$	
	ાકુ ષ ાં .	c)	$2f_m(1+\beta)$		d)	0.	

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CS/B.Tech (ECE-NEW)/SEM-4/EC-403/07



vi)	II tr	ne SNR of the signal is inreased then the channel capacity							
	a)	will increase b) will decrease							
	. c)	will remain constant d) cannot be determined.							
vii)	The intermediate frequency used for a superheterodyne AM receiver is								
	a)	455 kHz b) 755 kHz							
	c)	545 kHz d) none of these.							
viii)	A source X which produces five symbols with probabilities $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$ and $\frac{1}{16}$.								
	The	source entropy H (X) is							
	a)	1.875 b/symbols b) 2.875 b/symbols							
	c)	3 b/symbols d) 5.5 b/symbols.							
ix)	If ea	ach stage had a gain of 10 dB and noise figure of 10 dB, then the overall							
•	nois	se figure of a two-stage cascade amplifier will be							
	a)	10 b) 1.09							
	·c)	1·0 d) 10·9.							
x)	Pre	– emphasis in FM systems involves							
	a)	compression of the modulating signal							
	b)	expansion of the modulating signal							
	c)	amplification of the lower frequency components of the modulating signal							
	d)	amplification of the higher frequency components of the modulating signal.							
	٠								
xi)	In p	hase modulation the frequency deviation is							
• .	a)	independent of the modulating signal frequency							
	b)	inversely proportional to the modulating signal frequency							
	c)	directly proportional to the modulating signal frequency							
	d)	inversely proportional to the square root of the modulating signal frequency.							

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xii) An 8 kHz communication channel has an SNR of 30 dl	3. If the channel
bandwidth is doubled, keeping the signal power constant	, the SNR of the
modified channel will be	
a) 27 dB b) 30 dB	
c) 33 dB d) 60 dB.	
Group - B	
(Short Answer Type Questions)	
Answer any three questions.	$3 \times 5 = 15$
a) Define amplitude modulation and modulation index. Use a ske	tch of sinusoidally
modulated AM waveform to help to explain the definition.	2
	anomitter and the
b) Derive the expression between the output power of an AM tr	
depth of modulation.	3
What is angle modulation? Justify that frequency modulation is an ar	ngle modulation.
	2 + 3
Derive the expression of signal to noise ratio of DSB-SC system.	5
a) What do you mean by FDM? When is it used?	3
b) What is Carson's rule?	2
The equation for an FM wave is	
$S(t) = 10 \sin [5.7 \times 10^8 t + 5 \sin 12 \times 10^3 t]$	
Calculate:	

- a) Carrier frequency
- modulating frequency b)
- modulation index c)
- Frequency deviation d)
- Power dissipated in 100Ω . e)

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2.

3.

4.

5.

6.



Group - C

(Long Answer Type Questions)

		Answer any <i>three</i> questions. $3 \times 15 = 45$
7.	a)	What is the concept behind NBFM? Derive its equation.
	b)	Explain how FM can be generated using VCO.
	c)	Discuss about the roles of pre-emphasis and de-emphasis circuit in FM broadcasting.
8.	a)	Draw the block diagram for generation and detection of PCM system. 4
	b)	What is quantization? Find the signal to quantization noise ratio for PCM system.
	c)	A signal is sampled at Nyquist rate of 8 kHz & is quantized using 8 bit uniform quantizer. Assuming SNRq for a sinusoidal signal, calculate bit rate., SNRq & BW.
9.	a)	State and prove Parseval's Power Theorem. 2 + 4
	b)	Describe with a block diagram the principle of operation of a square law modulator generating DSBSC.
•	c)	Explain the advantages & disadvantages of modulation.
10.	a)	Draw the block diagram of a superheterodyne receiver & explain its working principle.
	b)	Explain the operation of balanced modulator. 5
11.	Write	e short notes on any three of the following: 3×5
	a)	Entropy & its properties
	b)	QCM .
	c)	Thermal noise
	d)	Power spectral density function
	e)	Pulse coded modulation.

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