

ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE - 2008 ANALOG COMMUNICATION SEMESTER - 4

Time	:	3	Hours	1

[Full Marks: 70

GROUP - A

(Multiple Choice Type Questions)

Cho	ose th	ne correct alternatives for any	ten of the	e following:	$10 \times 1 = 10$
i)	If X	(ω) is the Fourier transform of	of x(t), the	n the Fourier transform o	of x(t)e jω _o t
	a)	$X(\omega-\omega_0)$	b)	X (ω ₀ -ω)	
	c)	$X(\omega + \omega_0)$	d)	X (ω ₀).	
ii)	For	envelop detection in AM the	alue of R	C should be	
	a)	1/W< <rc<<1 fc<="" td=""><td>b)</td><td>1/W>>RC>>1/fc</td><td></td></rc<<1>	b)	1/W>>RC>>1/fc	
	c)	1/W<<1/RC<<1/fc	d)	W< <rc<<fc.< td=""><td></td></rc<<fc.<>	
iii)	The	capacity C of AWGN channel	is given	by	
•	a)	Blog ₁₀ (1+S/N)b/s	b)	Blog ₂ (1+S/N)b/s	
	c)	Blog ₁₀ (1+N/S)b/s	d)	$B\log_2(1+N/S)b/s$.	
iv)	Acc	ording to Carson's rule the ba	andwidth	of FM signal is expressed	as
	a)	$B=2\Delta f+f_m$	b)	$B=\Delta f+f_m$	
	c)	$B=\Delta f+2 f_m$	d)	$B=\Delta f+f_m/2.$	
v)	Var	actor diode is used for			
	a)	FM generation	b)	AM generation	
	c)	PM generation .	d)	All of these.	



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vi)	IF fr	equency for a superheterodyn	e comm	ercially available AM receiver is	
	a)	460 kHz	b)	500 kHz	• •
	c)	455 kHz	d)	355 kHz.	
vii)	The	bandwidth required for transi	nission (of SSB SC signal is	
	a)	more than AM signal	b)	less than DSB-SC signal	
	c)	more than VSB signal	d)	none of these.	
viii)	A si	gnum function is			
	a)	zero for t greater than zero	b)	zero for t less than zero	
	c)	unity for t greater than zero	d)	2u (t)-1.	
ix)	A pr	e-emphasis circuit provides ex	ktra nois	se immunity to	
	a)	boost the bass frequencies			
	b)	amplify the higher audio free	quencies		
	c)	pre-amplify the whole audio	band		
	d)	convert the PM to FM.	•	X	
x)	PWN	A may be generated			
	a)	by differentiating PPM			
	b)	with a monostable multivibra	ator		
	c)	by integrating the signal			
4	d)	with a free running multivib	rator.		
xi)	The	main advantage of TDM over F	DM is t	hat it	
	a)	needs less power			
	b)	needs less bandwidth	,		
· · · · · · · · · · · · · · · · · · ·	c)	needs simple circuit			
	d)	gives better signal to noise ra	ıtio.		

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xii) Flat-top sampling le	eads	to
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a)	an	aperture	effect

b) aliasing effect

loss of signal c)

d) none of these.

GROUP - B

(Short Answer Type Questions)

Answer any three of the following.

 $3 \times 5 \approx 15$

- A modulating signal given by $v_m=2 \sin (2\pi \times 500 t)$ amplitude modulates a carrier given by $v_c=10 \sin{(2\pi \times 10^6 t)}$. Determine
 - modulation index i)
 - (社 frequencies present in the modulated signal
 - tti) total transmitter power.

State and prove Parseval's theorem.

1 + 2

b) Verify Parseval's theorem for the signal $g(t)=e^{-at}u(t)$; a>0. 2

Explain the working principle of PLL for FM demodulation.

5

5. a) What do you mean by distortionless transmission?

- 2
- **b**) Obtain the conditions for distortionless transmission of signals through a system.
 - 3
- Distinguish between 'auto-correlation' and 'cross-correlation' functions. a)
 - b) What is a 'balanced modulator'? Explain the main advantages and disadvantages of such circuits. 5

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GROUP - C

(Long Answer Type Questions)

		Answer any three of the following questions. 3×15	5 = 45
7.	a)	Explain with suitable block diagram the generation of FM signal using Arms	trong
		method.	5
	b)	What is Narrowband FM and Wideband FM?	2
	c)	Explain with proper expression	
		i) modulation index for FM	
		ii) bandwidth required for transmission of FM.	4
	d)	The maximum deviation allowed in an FM broadcast system is 75 kHz. I	if the
		modulating signal is a single tone sinusoid of 10 kHz, find the bandwidth of	of the
		FM signal. What will be the change in the bandwidth, if the modulating frequency	ency
		is doubled? Determine the bandwidth when modulating signal amplitude is	also
		doubled.	4
3.	a)	Define DSB-SC and SSB-SC.	4
	b)	With neat block diagram explain the principle of SSB-SC generation by p	ohase
		shift method. What is VSB-SC modulation?	4 + 3
	c)	Briefly explain QAM.	4
9.	a)	What do you mean by 'switching modulator'? How can ring modulation be	acted
		as switching modulator?	5
	b)	Show that an AM system using synchronous detection does not suffer	from
		threshold effect.	5

Compare FDM with a quadrature carrier multiplexing.

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c)



١٥.	a) :	Discuss the methods for modulation and demodulation of PAM signal.	O
	b)	Compare PAM with PWM system of signal/data transmission.	6
	c)	Explain the terms 'sensitivity', 'selectivity' and 'fidelity' of a receiver.	3
11.	a)	In a multipath transmission system, the input and output are related by:	
		y (t) = x (t) + ax (t - τ), where a and τ are constants. Determine the transfer	er
	٠	function of the equalizer to compensate the channel induced distortion.	6
	b)	Determine the performance of an FM system in the presence of additive Gaussia	m
		noise. Discuss briefly the improvement offered in noise performance by pro-	2-
		emphasis and de-emphasis concepts.	9
12.	Write	e short notes on any three of the following: $3 \times$	5
•	i)	Superheterodyne receiver	
	ii)	Entropy	
	ш)	Stereophonic FM broadcasting	
	iv)	Source coding	
	v)	Convolution theorem.	

END