

B. Tech III Year I Semester Examinations, December-2011 COMMUNICATION THEORY (INFORMATION TECHNOLOGY)

Time: 3 hours

Max. Marks: 80

Answer any five questions All questions carry equal marks

1. a)	tate and prove the following properties of the Fourier transform Time scaling ii) Frequency shifting		
b)	The Fourier transform $X(f)$ of a signal $x(t)$ is defined by		
	$\begin{bmatrix} 1, & f > 0 \end{bmatrix}$		
	$X(f) = \begin{cases} \frac{1}{2} & f = 0 \end{cases}$		
	$\begin{bmatrix} 0, & f < 0 \end{bmatrix}$	FO 01	
	Determine x(t)	[8+8]	
2. a)	Discuss any four properties of power spectral density.		
b)	Explain Rayleigh probability density function.	[8+8]	
,			
3. a)	What is random variable?		
b)	Explain discrete and continuous random variable.		
c)	Distinguish between random variable and random processes. [4+4+	6]	
4 a)	Derive a mathematical expressions for probability distribution function	and	
1. u)	probability density function.	una	
b)	Compare SSB with VSB.	[10+6]	
5. a)	Draw the phasor diagram of AM and NBFM and explain.		
b)	Discuss the bandwidth consideration in FM.	[10+6]	
6. a)	What is quantization error? Derive an expression for quantization error.		
b)	State and prove the sampling theorem in time domain.	[8+8]	
,	1 1 0		
7. a)	Determine the entropy of binary memoryless source.		
b)	A voice-grade channel of the telephone network has a bandwidth of 3.4 KHz		
	i) Calculate the information capacity of the telephone channel for a sign	al-to-	
	noise ratio of 30dB.		
	11) Calculate the minimum signal-to-noise ratio required to support infor	rmation	
	transmission through the telephone channel at the rate of 9.6 kbps.	[8+8]	
8.	Write short notes on:		
	a) Cross talk		
	b) Convolutional codes		
	c) Adaptive delta modulation.	[16]	

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1. a) b) c)	What is random variable? Explain discrete and continuous random variable. Distinguish between random variable and random processes. [4+4+	-6]	
2. a)	Derive a mathematical expressions for probability distribution function and probability density function.		
b)	Compare SSB with VSB.	[10+6]	
3. a) b)	Draw the phasor diagram of AM and NBFM and explain. Discuss the bandwidth consideration in FM.	[10+6]	
4. a) b)	What is quantization error? Derive an expression for quantization error State and prove the sampling theorem in time domain.	[8+8]	
5. a) b)	 Determine the entropy of binary memoryless source. A voice-grade channel of the telephone network has a bandwidth of 3.4 KHz i) Calculate the information capacity of the telephone channel for a signal-to-noise ratio of 30dB. ii) Calculate the minimum signal-to-noise ratio required to support information 		
6.	 Write short notes on: a) Cross talk b) Convolutional codes c) Adaptive delta modulation. 	[8+8]	
7. a)	State and prove the following properties of the Fourier transform		
b)	The Fourier transform X(f) of a signal x(t) is defined by $X(f) = \begin{cases} 1, & f > 0 \\ \frac{1}{2}, & f = 0 \end{cases}$		
	$\begin{bmatrix} 0, & f < 0 \end{bmatrix}$	FO 1 01	
		[0+0]	
8. a)	Discuss any four properties of power spectral density.		

b) Explain Rayleigh probability density function. [8+8]

Code No: RR311202



SET-3

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1. a) b)	Draw the phasor diagram of AM and NBFM and explain. Discuss the bandwidth consideration in FM.	[10+6]
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3. a) b)	 Determine the entropy of binary memoryless source. A voice-grade channel of the telephone network has a bandwidth of 3. i) Calculate the information capacity of the telephone channel for a signoise ratio of 30dB. ii) Calculate the minimum signal-to-noise ratio required to support inf transmission through the telephone channel at the rate of 9.6 kbps. 	4 KHz gnal-to- formation [8+8]
4.	Write short notes on: a) Cross talk b) Convolutional codes c) Adaptive delta modulation.	[16]
5. a) b)	State and prove the following properties of the Fourier transform i) Time scaling ii) Frequency shifting The Fourier transform X(f) of a signal x(t) is defined by $X(f) = \begin{cases} 1, & f > 0 \\ \frac{1}{2}, & f = 0 \end{cases}$	
	$ \begin{array}{l} 0, f < 0 \\ \text{Determine } \mathbf{x}(t) \end{array} $	[8+8]
6. a) b)	Discuss any four properties of power spectral density. Explain Rayleigh probability density function.	[8+8]
7. a) b) c)	What is random variable? Explain discrete and continuous random variable. Distinguish between random variable and random processes. [4+4	+6]
8. a) b)	Derive a mathematical expressions for probability distribution function probability density function. Compare SSB with VSB.	n and [10+6]

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- 1. a) Determine the entropy of binary memoryless source.
 - b) A voice-grade channel of the telephone network has a bandwidth of 3.4 KHz
 i) Calculate the information capacity of the telephone channel for a signal-tonoise ratio of 30dB.
 - ii) Calculate the minimum signal-to-noise ratio required to support information transmission through the telephone channel at the rate of 9.6 kbps. [8+8]
- 2. Write short notes on:
 - a) Cross talk
 - b) Convolutional codes
 - c) Adaptive delta modulation.

[16]

- 3. a) State and prove the following properties of the Fourier transformi) Time scalingii) Frequency shifting
 - b) The Fourier transform X(f) of a signal x(t) is defined by

$$X(f) = \begin{cases} 1, & f > 0\\ \frac{1}{2}, & f = 0\\ 0, & f < 0 \end{cases}$$

Determine x(t)

[8+8]

- 4. a) Discuss any four properties of power spectral density.
 - b) Explain Rayleigh probability density function. [8+8]
- 5. a) What is random variable?
 - b) Explain discrete and continuous random variable.
 - c) Distinguish between random variable and random processes. [4+4+6]
- 6. a) Derive a mathematical expressions for probability distribution function and probability density function.
 b) Compare SSB with VSB. [10+6]
- 7. a) Draw the phasor diagram of AM and NBFM and explain.
 b) Discuss the bandwidth consideration in FM. [10+6]
 8. a) What is quantization error? Derive an expression for quantization error.
- b) State and prove the sampling theorem in time domain. [8+8] --ooQoo--