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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E.   **Semester: V**

Branch: Electronics & Telecommunication Engineering   **Duration: 3 hrs.**

Course Code: 23ET5PCCS2   **Max Marks: 100**

Course: COMMUNICATION SYSTEMS-2

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

				CO	PO	Marks
			UNIT - I			
1	a)		Define Random Variable. Write the expressions for statistical averages mean, moments and central moment	CO2	PO1	**08**
	b)		Define Autocorrelation. List and explain the properties of Autocorrelation.	CO2	PO1	**08**
	c)		Define noise figure with relevant expression and explain the terms used.	CO2	PO1	**04**
			OR			
2	a)		State and explain central limit theorem	CO1	-	**06**
	b)		Define white noise. Give the expression for power spectral density of white noise. Also derive autocorrelation function of white noise.	CO2	PO1	**08**
	c)		Define cross correlation. List and explain the properties of cross correlation.	CO2	PO1	**06**
			UNIT - II			
3	a)		Describe the working of Tuned radio frequency receiver using a block diagram.	CO1	-	**10**
	b)		In a broadcast super heterodyne receiver having no RF amplifier the loaded Q of the antenna coupling circuit is 100. If the intermediate frequency is 455 kHz, calculate (i) The image frequency and its rejection ratio at 1000 KHz. (ii) The image frequency and its rejection ratio at 25 MHz.	CO3	PO2	**10**
			OR			

	4	a)	With neat block diagram explain the working of super heterodyne receiver	CO1	-	10
		b)	List the advantages of RF amplifier	CO1	-	04
		c)	Define and explain the following: (i) sensitivity (ii) selectivity (iii) image frequency and rejection	CO2	PO1	06
			UNIT - III			
	5	a)	With relevant equations, describe the steps involved in Gram Schmidt Orthogonalization procedure	CO2	PO1	10
		b)	With neat block diagram, explain the binary FSK transmitter and receiver	CO1	-	10
			OR			
	6	a)	A signal is given by $s(t) = \begin{cases} \dfrac{A}{2}; 0 \le t \le \dfrac{T}{2} \\ -\dfrac{A}{2}; \dfrac{T}{2} \le t \le T \end{cases}$ (i) Plot s(t) (ii) Plot impulse response of matched filter (iii) Plot matched filter output (iv) Write the peak value of output	CO3	PO2	10
		b)	Describe the following with relevant block diagram, expressions and waveforms (i) Non Coherent detection of ASK (ii) Coherent detection of ASK	CO1	-	10
			UNIT - IV			
	7	a)	Describe OFDM transmitter and receiver	CO1	-	10
		b)	Describe the following with relevant block diagram and expressions. (i) DPSK generation (ii) DPSK detection	CO1	-	10
			OR			
	8	a)	Describe the process of GMSK generation	CO1	-	06
		b)	Give the expression for BER of ASK and explain the terms used	CO2	PO1	04

		c)	Expalin the following with relevant block diagram and expressions. (i) QPSK generation (ii) QPSK detection	*CO1*	-	**10**
			UNIT - V			
	9	a)	Describe the following with relevant block diagram and expressions. (i) Direct sequence spread spectrum Transmitter (ii) Direct sequence spread spectrum Receiver	*CO1*	-	**10**
		b)	Write the expression to calculate Jamming margin and explain the terms used. Also calculate the processing gain if the information bit duration is 4.095ms and PN chip duration is 1μs.	*CO3*	*PO2*	**06**
		c)	Describe the process of generating a PN sequence using a block diagram	*CO1*	-	**04**
			OR			
	10	a)	Explain the process of CDMA	*CO1*	-	**06**
		b)	Describe the following with relevant block diagram and expressions. (i) Frequency hopped spread spectrum Transmitter (ii) Frequency hopped spread spectrum Receiver	*CO1*	-	**10**
		c)	Give the applications of spread spectrum in communication system.	*CO1*	-	**04**

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