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

Autonomous Institute Affiliated to VTU

October 2024 Supplementary Examinations

Programme: B.E. **Semester: IV**
Branch: Electronics and Communication Engineering **Duration: 3 hrs.**
Course Code: 23EC4PCPCS **Max Marks: 100**
Course: Principles of Communication Systems

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)		Consider the standard AM wave equation and derive the expression for Single tone Amplitude Modulation. Represent all the signals in time domain and frequency domain.	CO 1	PO1	**10**
	b)		An amplitude modulated wave has the form $S_{AM}(t) = [10\cos(2\pi \times 10^6 t) + 5\cos(2\pi \times 10^6 t)(\cos(2\pi \times 10^3 t) + 2\cos(2\pi \times 10^6 t)\cos(4\pi \times 10^3 t)]$ V i. Find the total modulated power, the sideband power assuming unit ohm resistive load. ii. Obtain the total modulation index.	CO 1	PO1	**04**
	c)		Show that amplitude modulated wave can be obtained using square law device and a filter, with diagram and expressions.	CO 2	PO2	**06**
			UNIT – II			
2	a)		With a neat circuit diagram, discuss the generation of DSBSC signal using ring modulator. Also, represent its frequency spectrum with necessary equations.	CO 2	PO2	**10**
	b)		Derive an expression for SSB modulated wave for which Upper Side Band (USB) is retained in time domain.	CO 2	PO2	**10**
			OR			
3	a)		With a neat block diagram, explain the coherent detection of DSBSC waves. Elaborate on the types of errors occur using this method of detection.	CO 2	PO2	**10**
	b)		With a neat block diagram, discuss the generation of SSB-SC using phase discrimination method with relevant expressions.	CO 2	PO2	**10**

			UNIT - III			
4	a)		Consider a single tone frequency modulated wave expression and derive the expression for FM wave when $\beta \ll 1$. Illustrate the block diagram for expression obtained.	*CO 1*	*PO1*	**10**
	b)		With all necessary diagrams, derive the expression for instantaneous frequency in time domain using Direct FM method.	*CO 1*	*PO1*	**10**
			OR			
5	a)		Give the time domain expressions for PM and FM wave. Illustrate with neat block diagram, how FM signal can be obtained from PM modulator.	*CO 2*	*PO2*	**06**
	b)		A FM wave is represented by the following equation: $s(t) = 10 \cos [5 \times 10^8 t + 4 \sin (1250\ t)]$. Find i) Modulation index ii) Modulation frequency iii) Frequency deviation iv) Carrier Frequency v) Power of FM wave in an 5 Ω resistor.	*CO 1*	*PO1*	**04**
	c)		Bandwidth of Wide Band FM wave is infinite. Justify it using appropriate expressions and spectrums.	*CO 2*	*PO2*	**10**
			UNIT – IV			
6	a)		Define the terms: i. Noise figure ii. Fidelity iii. Image frequency rejection ratio	*CO 1*	*PO1*	**06**
	b)		Discuss the threshold effect in angle modulation	*CO 1*	*PO1*	**04**
	c)		With neat circuit diagrams, explain the Pre-emphasis and De-emphasis circuit	*CO 1*	*PO1*	**10**
			UNIT – V			
7	a)		Discuss in detail the practical aspects of sampling and signal recovery elaborating on the types of sampling techniques used in practical sampling.	*CO 1*	*PO1*	**10**
	b)		Consider 'N' low frequency message signals. Using Pulse Amplitude Modulation (PAM) technique, device a scheme to transmit and receive the 'N' signal using single communication channel.	*CO 2*	*PO2*	**10**

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