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

Autonomous Institute Affiliated to VTU

February 2025 Semester End Main Examinations

Programme: B.E.   Semester: IV
Branch: Electronics and Telecommunication Engineering   Duration: 3 hrs.
Course Code: 22ET4PCCS1   Max Marks: 100
Course: Communication System - I

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

			UNIT - I	CO	PO	Marks
1	a)		Explain the generation of AM using square law modulator with appropriate time domain derivation	CO1		06
	b)		Describe detection of AM using envelope detector.	CO2	PO1	08
	c)		A carrier wave C(t)=4 sin($2\pi \times 500 \times 10^3$t) is amplitude modulated by an audio wave m(t) =0.2 sin 3($2\pi \times 500$t)+ 0.1 sin 5($2\pi \times 500$t). Determine upper and lower sidebands and sketch the complete spectrum of the modulated wave. Estimate power in sidebands.	CO3	PO2	06
			OR			
2	a)		Derive the equation for total transmitted power of AM modulated signal. Sow that total power comprises of 3 components.	CO1		10
	b)		Derive the equation for DSBSC coherent detection with relevant block diagram and spectrum	CO2	PO1	10
			UNIT - II			
3	a)		Derive an expression for VSB modulated wave for which upper side band is retained.	CO2	PO1	08
	b)		Describe frequency division multiplexing with appropriate block diagram.	CO2	PO1	06
	c)		Prove that the signal $$s(t) = \sum_{i=1}^{N}[\cos(2\pi f_c t)\cos(2\pi f_i t + \phi_i) - \sin(2\pi f_c t)\sin(2\pi f_i t + \phi_i)]$$ Is an SSB signal ($f_c \gg f_N$), Identify the sideband and plot the spectrum. ii)obtain an expression for missing sideband and plot the spectrum. iii)Obtain an expression for the total DSB-SC signal and plot the spectrum.	CO3	PO2	06
			OR			

	4	a	With block diagram explain the generation of two stage SSB modulator. Give advantages and applications of SSB modulated signal.	CO1		10
		b	Derive the time domain expression for SSB modulated signal along with spectrum of modulated signal .	CO2	PO1	10
			UNIT - III			
	5	a)	Describe Generation of NBFM using Indirect method.	CO1		06
		b)	Derive time domain equation for single tone sinusoidal FM.	CO2	PO1	08
		c)	Determine the permissible range in maximum modulation index for i) Commercial FM that has 30 Hz to 15 Khz modulating frequencies. ii) Narrow band system that allows maximum deviation of 10 KHz and 100Hz to 3KHz modulating frequencies.	CO3	PO2	06
			OR			
	6	a)	Describe the detection of FM using frequency discrimination method	CO1		08
		b)	Show that FM signals has infinite sidebands with appropriate derivation.	CO2	PO1	12
			UNIT - IV			
	7	a)	With block diagram explain the PAM-TDM	CO1		06
		b)	Give the block diagram of modified duo-binary signaling scheme. Obtain and sketch the transfer function of the system. Obtain and sketch the impulse response of the system.	CO2	PO1	08
		c)	Given a binary sequence 0110010101, sketch Polar, Bipolar and Manchester baseband data formats.	CO2	PO1	06
			OR			
	8	a	Derive the SNR of Pulse code modulation for sinusoidal signal as input and show that it is equal to 1.76+6n.	CO2	PO1	10
		b	With block diagram explain PCM system	CO1		10
			UNIT - V			
	9	a)	Explain coherent PSK transmitter and receiver with block diagram. Derive the expression for probability of error of FSK along with signal constellation diagram.	CO2	PO1	10
		b)	Two functions s1(t) and s2(t) are given in the below figure. The interval is 0≤t≤T seconds. Using gram-Schmidt procedure express these functions in terms orthonormal functions. Also sketch Φ1(t)and Φ2(t)	CO2	PO1	10
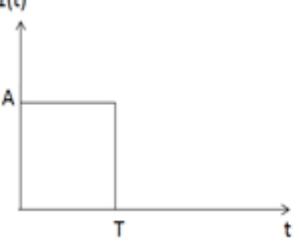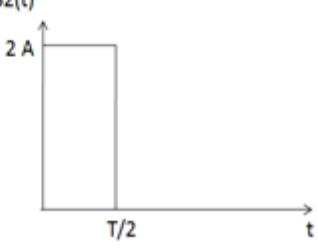
			OR			
10	a)		With block diagram explain the generation of FSK using appropriate block diagram	*CO1*		**10**
	b)		With appropriate derivation obtain expression for probability of error for P SK modulated signal along with signal space diagram	*CO2*	*PO1*	**10**

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