U.S.N.										

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

Autonomous Institute Affiliated to VTU

August 2024 Semester End Main 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.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

				CO	PO	Marks
			UNIT – I			
1	a)		Explain modulation and Justify the need for modulation.	*CO1*	*PO1*	**06**
	b)		With necessary expressions, Analyse a single-tone AM signal.	*CO2*	*PO2*	**06**
	c)		An AM transmitter radiates 9kW of power when the carrier is un-modulated and 10.125kW of power when the carrier is sinusoidal modulated. Find the modulation index & Percentage modulation. Now if another sine wave corresponding to 40% modulation is transmitted Simultaneously. Calculate total radiated power.	*CO1*	*PO1*	**04**
	d)		A given AM broadcast station transmits a total power of 5kW when the carrier is modulated by sinusoidal signal with a modulation index of 0.7071.Determine Carrier power and Transmission Efficiency.	*CO1*	*PO1*	**04**
			UNIT – II			
2	a)		Explain generation of DSB-SC signal with the help of balanced modulator using diodes.	-	-	**08**
	b)		A carrier wave with amplitude 12V and frequency 10MHz is amplitude modulated to 50% level with a modulating frequency 1KHz, write down equation of the above wave and sketch the waveform in frequency domain.	*CO1*	*PO1*	**06**
	c)		A 1000kHz carrier is simultaneously modulated with 300Hz, 800Hz and 2kHz audio sine waves. Select the frequencies present in the output.	*CO1*	*PO1*	**06**
			OR			
3	a)		In coherent detection, if carrier applied is $\cos(2\pi f_c t+\Phi)$. prove that there is a phase error in the output and output consist not only the message signal but its Hilbert transform.	*CO2*	*PO2*	**10**

		b)	With the help of neat diagram show the spectrum of a TV signal Transmission using VSB .	*CO1*	*PO1*	**05**
		c)	Explain with a neat diagram the working of FDM transmitter and receiver.	*CO1*	*PO1*	**05**
			UNIT - III			
	4	a)	Differentiate phase modulation and frequency modulation.	*CO2*	*PO2*	**06**
		b)	Identify the relationship between the instantaneous carrier frequency and modulating signal for FM.	*CO1*	*PO1*	**06**
		c)	Show that a FM signal has infinite sidebands, using the mathematical relations and draw the spectrum.	*CO2*	*PO2*	**08**
			OR			
	5	a)	Analyze the indirect method for generating wideband FM signal.	*CO2*	*PO2*	**10**
		b)	A 107.6MHz carrier signal is frequency modulated by a 7kHz sine wave. The resultant FM signal has a frequency deviation of 50kHz. Find the carrier swing of the FM signal, the highest and the lowest frequencies attained by the modulated signal, modulation index of the FM wave.	*CO1*	*PO1*	**06**
		c)	Summarize the Bandwidth requirements for angle modulated waves.	*CO2*	*PO2*	**04**
			UNIT – IV			
	6	a)	Discuss about different sources of noise. A radio receiver with 10KHz bandwidth has a noise figure of 30dB. Determine the signal power required at the input of receiver to achieve input SNR at 30dB.	*CO2*	*PO2*	**10**
		b)	Obtain the expression for figure of merit of AM system, with its block diagram.	*CO1*	*PO1*	**10**
			UNIT – V			
	7	a)	Explain the necessity of implementing PAM?	*CO1*	*PO1*	**05**
		b)	A bandpass signal has the spectral range that extends from 20 kHz and 82 kHz. Find the acceptable range of sampling frequency.	*CO1*	*PO1*	**05**
		c)	Explain natural and flattop sampling techniques.Sketch the spectrum of sampled signal at (i) $f_s=2f_m$; (ii) $f_s>2f_m$ and (iii) $f_s<2f_m$	*CO1*	*PO1*	**10**

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