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: 22EC4PCPCS **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)	With the help of a neat diagram explain the generation of AM wave using a Switching Modulator with relevant mathematical equations and Wave forms	*CO 1*	*PO 1*	**10**
	b)	Explain why pre-processing of signals is required before transmission ?	*CO 1*	*PO 1*	**06**
	c)	An antenna has an impedance of 40Ω. An un-modulated AM signal produces a current of 4.8A. The modulation is 90%. Calculate the carrier power, the total power and the side band power?	*CO 1*	*PO 1*	**04**
		UNIT - II			
2	a)	Derive an output equation of ring modulator for sinusoidal modulating wave m(t)	*CO 1*	*PO 1*	**08**
	b)	Explain costas loop and its role in demodulation of DSBSC signals.	*CO 1*	*PO 1*	**07**
	c)	Vestigial sideband is commonly used in television transmission why?	*CO 1*	*PO 1*	**05**
		OR			
3	a)	With a neat block diagram explain the generation of SSB modulated wave using phase discriminator method?	*CO 1*	*PO 1*	**10**
	b)	Discuss Hilbert transform and its properties?	*CO 1*	*PO 1*	**06**
	C)	Consider a carrier signal which is amplitude modulated by a single tone sinusoidal message signal with modulation index of 70%.If the carrier and one of the sidebands are suppressed in the modulated signal, then compute the percentage of power saved ?	*CO 1*	*PO 1*	**04**

			UNIT - III			
	4	a)	A sinusoidal modulating waveform of amplitude 5V and a frequency of 2KHz is applied to FM generator, which has a frequency sensitivity of 40Hz/volt. Calculate the frequency deviation, modulation index, and bandwidth.	***CO 1***	***PO 1***	**06**
		b)	With a neat block diagram explain FDM technique	-	-	**06**
		c)	Show that the bandwidth of WBFM is infinity and specify the amplitude of carrier and sidebands.	***CO 2***	***PO 2***	**08**
			OR			
	5	a)	An FM wave is given by $s(t)=20\cos(8\pi\times10^6t+9\sin(2\pi\times10^3t))$. Calculate the frequency deviation, bandwidth, and power of FM wave.	***CO 1***	***PO 1***	**06**
		b)	Define Angle Modulation? show the scheme for generating PM wave using FM?	***CO 1***	***PO 1***	**07**
		c)	Explain the generation of Narrow band FM using DSBSC Modulator?	***CO 1***	***PO 1***	**07**
			UNIT - IV			
	6	a)	If an receiver is designed using an coherent detector, Obtain the design equation for SNR and Figure of Merit of the receiver	***CO 2***	***PO 2***	**10**
		b)	Explain the need of pre-emphasis and de-emphasis? Show how they are implemented?	***CO 1***	***PO 1***	**10**
			UNIT - V			
	7	a)	Determine the number of bits/sec generated by a PCM System, if the bandwidth of TV video and audio signal of 4.5MHz is to be converted to PCM stream with 1024 quantization levels. Assume the signal is sampled at 20% above Nyquist rate.	***CO 1***	***PO 1***	**06**
		b)	Determine the Nyquist rate and interval for the following Signal $x(t)=5\cos(2000t)+7\sin(7000t)$	***CO 1***	***PO 1***	**06**
		c)	With necessary block diagram explain the generation of PCM signal and the reconstruction of original telephone signal.	***CO 1***	***PO 1***	**08**

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