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

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

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

Branch: Electronics and Instrumentation Engineering   **Duration: 3 hrs.**

Course Code: 23EI5PCCST   **Max Marks: 100**

Course: 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.

			MODULE - I	*CO*	*PO*	**Marks**
1	a)		Describe the generation of AM wave using switching modulator and sketch the waveform in both time and frequency domain.	*CO1*	*PO1*	**10**
	b)		With neat circuit diagram explain the construction and working principle of the Quadrature carrier multiplexing transmitter and receiver system.	*CO1*	*PO1*	**10**
			OR			
2	a)		Describe the generation of DSB-SC signal using ring modulator and represent the relevant waveforms both in time and frequency domain.	*CO1*	*PO1*	**10**
	b)		Audio frequency signal amplitude of 8V and frequency 100Hz is amplitude modulated with carrier amplitude of 16V and frequency of 10kHz. Calculate modulation index, frequency of each side bands and bandwidth required.	*CO1*	*PO1*	**04**
	c)		Explain the reconstruction of DSB-SC signal using Costas receiver.	*CO1*	*PO1*	**06**
			MODULE - II			
3	a)		Show that how FM wave can be generated using PM and PM wave from FM system?	*CO1*	*PO1*	**08**
	b)		Explain the demodulation of FM wave using frequency discriminator or balance slope detector method.	*CO1*	*PO1*	**08**
	c)		An FM wave with modulating frequency of 5kHz and carrier frequency is 90MHz with modulation index is 5. Find the frequency deviation and bandwidth.	*CO1*	*PO1*	**04**
			OR			
4	a)		Summarize Wide Band Frequency Modulation (WBFM) has infinite number of side bands.	*CO1*	*PO2*	**10**
	b)		Write brief note on generation of direct FM signal with circuit diagram.	*CO1*	*PO1*	**05**
	c)		Compare the Amplitude modulation and Frequency modulation system.	*CO1*	*PO1*	**05**

			MODULE - III			
5	a)		With relevant receiver model diagram derive the figure of merit (FOM) of an AM receiver with envelope detector is equal to $\frac{\mu^2}{2+\mu^2}$	CO2	PO2	**12**
	b)		An AM receiver operating with a sinusoidal wave of 80% modulation has an output signal to noise ratio of 30dB. Calculate the corresponding channel to noise ratio in dB.	CO2	PO2	**08**
			OR			
6	a)		Interpret the Pre-emphasis and De-emphasis filters improves the reconstruction of FM wave.	CO2	PO2	**12**
	b)		An FM Signal with a maximum frequency deviation of 75kHz is applied to an FM demodulator. When the input channel SNR is 15dB and the modulating frequency is 10kHz. Estimate the FOM and SNR at demodulated output.	CO2	PO2	**08**
			MODULE - IV			
7	a)		Write the difference between natural sampling and flat top sampling.	CO3	PO2	**05**
	b)		With neat circuit diagram and waveform explain the Pulse Amplitude Modulation.	CO3	PO2	**05**
	c)		Explain delta modulation system with relevant transmitter and receiver model. Sketch the waveform with slope overload distortion and granular noise.	CO3	PO2	**10**
			OR			
8	a)		Explain quantization process in communication system.	CO3	PO1	**06**
	b)		With neat block diagram explain the Pulse Code Modulation (PCM) system.	CO3	PO1	**06**
	c)		With relevant transmitter and receiver diagram explain the Differential Pulse Code Modulation (DPCM) system.	CO2	PO2	**08**
			MODULE - V			
9	a)		With suitable transmitter and receiver diagram explain the BPSK modulation and write the corresponding waveform and constellation diagram.	CO3	PO2	**10**
	b)		Describe the Time Division Multiple Access (TDMA) in second generation cellular system.	CO3	PO1	**10**
			OR			
10	a)		Given m (n) = {1 1 0 01 0 1 1 0}, write a suitable QPSK waveform and explain the transmitter and receiver system with constellation diagram.	CO3	PO2	**10**
	b)		With relevant diagram explain the Frequency Division Multiple Access (FDMA) Technique.	CO3	PO1	**10**

******