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

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E.   **Semester: IV**

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

Course Code: 23ET4PCCS1   **Max Marks: 100**

Course: Communication System-1

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	*CO*	*PO*	**Marks**
1	a)		Obtain the expression for modulation index of an AM wave for single tone modulation	*CO2*	*PO1*	**07**
	b)		Describe the balanced modulator using diodes or ring modulator	*CO1*		**07**
	c)		The output voltage of a transmitter is given by the equation below. This voltage is fed to a load of 500 Ω resistance. Determine (i) Carrier frequency (ii) Modulating frequency (iii) Carrier power (iv) Total output power. Sketch the waveform in frequency domain. $$600(1 + 0.6cos6280t)cos3.14 \times 10^7 t$$	*CO2*	*PO1*	**06**
			OR			
2	a)		Obtain the expression for modulation index of an AM wave for multi tone modulation	*CO2*	*PO1*	**07**
	b)		Describe the method of obtaining a practical synchronous receiving system	*CO2*	*PO1*	**07**
	c)		A 360W carrier is simultaneously modulated by two audio waves with modulation percentage of 55 and 65 respectively. What is the total sideband power radiated?	*CO2*	*PO1*	**06**
			UNIT - II			
3	a)		Describe Hilbert transform and prove the properties of Hilbert transform	*CO1*	-	**08**
	b)		Describe the method to determine the Pre-envelope of the SSB modulation	*CO1*	-	**07**
	c)		Describe the Frequency Division Multiplexing with block diagram	*CO1*	-	**05**
			OR			
4	a)		Describe the phase shift method for generating SSB	*CO1*	-	**08**

		b)	Describe the single tone modulation of SSB wave.	CO1	-	**07**
		c)	Describe the demodulation of VSB modulated wave			**05**
UNIT - III
	5	a)	Describe the zero crossing detector of an FM demodulation	CO1	-	**08**
		b)	Derive the expression for modulation index of an FM wave	CO2	PO1	**07**
		c)	The equation of an FM wave is given below. Calculate (i) carrier frequency (ii) modulating frequency (iii) modulation index (iv) frequency deviation (v) power dissipated in 100Ω. $$S(t)=20 \sin[4.5 \times 10^8 t + 10 \sin 10 \times 10^3 t]$$	CO2	PO1	**05**
OR
	6	a)	Describe the generation of an FM wave using Oscillator	CO1	-	**08**
		b)	Sketch FM and PM waves for the modulating signal m (t) with a square wave of amplitude in the range of +2 and -2. Assume frequency of 50MHz and the constants Kf and Kp as and respectively	CO2	PO1	**06**
		c)	A 93.4MHz carrier is frequency modulated by a 10KHz sine wave. The resultant FM signal has a frequency deviation of 50 KHz. I Find the carrier swing of the FM signal Ii What are the highest and lowest frequencies attained by the frequency modulated signal Iii Calculate the modulation index for the wave.	CO2	PO1	**06**
UNIT - IV
	7	a)	State and prove sampling theorem for low pass signals	CO2	PO1	**08**
		b)	Describe the time division multiplexing with a block diagram	CO1	-	**05**
		c)	What are the two fold effect of quantization process	CO1	-	**07**
OR
	8	a)	Derive the expression for quantization noise and SNR in Pulse code modulation	CO2	PO1	**8**
		b)	Describe the sample and hold circuit for signal recovery with a block diagram	CO1	-	**07**
		c)	What are the advantages and disadvantages of Digital communication systems	CO1	-	**05**
UNIT - V
	9	a)	Derive the condition for Nyquist criteria for distortion less base band transmission	CO2	PO1	**07**
		b)	The binary data 001101001 are applied to the input of Duo-Binary system	CO2	PO1	**08**

			(i) Construct the Duo binary coder output and the corresponding receiver output without a precoder (ii) Suppose that due to the error during the transmission , the levels at the receiver input produced by the second digit is zero, construct the new receiver output (iii) Repeat the above two cases with the precoder			
		c)	Describe the Eye-pattern used to study the effect of ISI in baseband transmission	*CO1*	-	**05**
			OR			
	10	a)	For the binary data 101011100, write the line coding waveform for Polar, Unipolar, Bipolar, Differential encoding, Manchester encoding and Differential Manchester encoding	*CO2*	*PO1*	**06**
		b)	Describe the tapped delay line filter corresponding to the generalised form of correlative coding	*CO1*	-	**08**
		c)	Describe the transmission bandwidth requirement of Raised cosine filter	*CO1*	-	**06**

******