RollNo. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, NOV / DEC 2024

ELECTRONICS AND COMMUNICATION ENGINEERING
IV Semester
EC5402 & COMMUNICATION THEORY
(Regulation2019)

Time:3hrs Max.Marks: 100

CO1	Ability to apply transforms for signal modulation techniques.
CO2	Ability to develop the architecture of communication system for analog modulation techniques.
CO3	Ability to explore the role of random process in communication system.
CO4	Ability to analyze the noise performance of analog communication receiver.
CO5	Learn the speech coding techniques and communication system.

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A(10x2=20Marks)
(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	Draw the phasor diagrams of AM wave and FM wave.	2	1	1
2	What is the significance of the image frequency in a Superheterodyne Receiver? Also, write it's expression.	2	1	1
3	Explain the concept of a narrowband and wideband signal in the context of Angle Modulation.	2	2	2
4	Explain the basic working principle of a Phase Locked Loop.	2	2	1
5	State Central Limit Theorem.	2	3	1
6	Explain the significance of Power Spectral Density in signal analysis.	2	3	2
7	What is the effect of white noise on the performance of AM and FM systems?	2	4	2
8	Write the expression for thermal noise voltage across a resistor.	2	4	1
9	Define TDM and FDM.	2	5	2
10	Define sampling and Nyquist criterion.	2	5	1

PART- B(5x 13=65Marks)
(Restrict to a maximum of 2 subdivisions)

Q.No.	Questions	Marks	CO	BL
11 (a) (i)	Explain the Super heterodyne receiver using a neat block diagram.	13	1	1
	OR			
11 (b) (i)	Explain the Fourier Transform and its application in Amplitude Modulation (AM).	6	1	4
(ii)	Describe the generation of AM wave using switching modulator.	7	1	1
12 (a)	Discuss the process of demodulating a Stereo FM signal.	13	2	1
	OR			
12 (b)	Explain the operation of PLL as a FM demodulator.	13	2	1
13 (a)	What is power spectral density? Derive the expression and state its properties.	13	3	2

	OR			
13 (b)	Explain the transmission of a random signal through a Linear Time-Invariant (LTI) filter. Discuss the key concepts involved and analyse the effects on the signal's properties.	**13**	3	2
14 (a)	Obtain the expression for effective noise temperature of a cascade amplifier from Friss formula.	**13**	4	2
	OR			
14 (b)	Derive the expression for the SNR at the output of an FM demodulator.	**13**	4	2
15 (a)	Draw the block diagram of PCM and explain each. Obtain the expression for signal to quantization noise ratio.	**13**	5	1
	OR			
15 (b)(i)	Explain Subband Coding.	**9**	5	1
(ii)	Briefly explain the Time division multiplexing scheme.	**4**	5	1

PART- C(1x 15=15Marks)
(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16.	A certain AM transmitter radiates 10 KW with a modulated carrier power as 11.8 KW when the carrier is sinusoidally modulated. Find the modulation index if another sine wave corresponding to 30% modulation is transmitted simultaneously. Determine the total radiated power.	**15**	1	5