Q.P.Code:23EC0409	R23	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year II Semester Regular Examinations July/August-2025

ANALOG AND DIGITAL COMMUNICATIONS

(Electronics and Communications Engineering)

Time: 3 Hours **Max. Marks: 70**

PART-A

(Answer all the Questions **10 x 2 = 20** Marks)

1	a	What is the need for modulation?	CO1	L1	2M
	b	List the method of generation of amplitude modulation.	CO2	L2	2M
	c	Explain the relationship between FM and PM.	CO2	L2	2M
	d	Compare AM & FM.	CO2	L2	2M
	e	What is the difference between high power modulation and low power Modulation.	CO5	L2	2M
	f	Explain the superhetrodyne principle.	CO1	L2	2M
	g	Define figure of merit.	CO4	L2	2M
	h	Explain the difference between TDM & FDM.	CO3	L2	2M
	i	Explain how bit error rate (BER) affects the performance of a system.	CO4	L3	2M
	j	What is ISI and what causes it?	CO1	L3	2M

PART-B

(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2	a	Derive the expression for AM in both time domain and frequency domain With necessary waveforms.	CO2	L2	5M
	b	A 500W, 100KHz carrier is modulated to a depth of 60% by modulating Frequency of 1KHz. Calculate the total power transmitted. What are the sideband components of AM Wave?	CO3	L3	5M

OR

3	a	Explain the AM generation using a Switching modulator.	CO2	L2	5M
	b	Analyse the DSB-SC wave in time domain and frequency domains.	CO3	L3	5M

UNIT-II

4	a	What is Pre-emphasis and De-emphasis explain?	CO1	L2	5M
	b	The max deviation allotted in FM broadcasting system is 75KHz. The modulated signal is a single tone sinusoidal of 8kHz. Determine band width of FM. What will be the bandwidth when modulating signal amplitude is doubled.	CO3	L3	5M

OR

5	a	Explain the concept of FM detection using PLL.	CO2	L3	5M
	b	A sinusoidal modulating signal with amplitude 10V and a frequency of 1KHz is applied to FM generator that has a frequency sensitivity constant of 40Hz/V. Determine the i) Frequency Deviation ii) Modulation Index	CO3	L3	5M

UNIT-III

6	a	Draw the block diagram of FM receiver and explain its working.	CO2	L2	5M
	b	List and explain the characteristics of radio receivers	CO4	L3	5M

OR

7	a	When a super heterodyne receiver is tuned to 555kHz, its local oscillator provides the mixer with an input at 1010 kHz. What isthe image frequency? The antenna of this receiver is connected to the mixer via a tuned circuit whose loaded Q is 40. What will be the rejection ratio for the calculated image frequency?	CO3	L3	6M
	b	Compare AM and FM receivers.	CO3	L2	4M

UNIT-IV

8	a	Analyse noise in AM receiver with envelope detection.	CO4	L3	6M
	b	Define figure of merit and output signal to noise ratio.	CO4	L2	4M

OR

9	a	A sinusoidal signal with a frequency of 5 kHz is transmitted through a channel after modulation. The peak amplitude of the unmodulated carrier is 2V. The modulation index is μ 0.5. The two sided power spectral density of noise is 10-8 W/Hz. Find in dB i) signal to noise ratio at the input of the receiver ii) signal to noise ratio at the output of the receive	CO4	L3	6M
	b	What is capture effect in FM?	CO1	L2	4M

UNIT-V

10	a	Express the transmitted signals in BPSK. Draw and explain the signal space diagram for 16-PSK.	CO2	L3	6M
	b	What is ISI? Explain how it can be avoided in a dispersive channel?	CO1	L2	4M

OR

11	a	Explain the generation and detection of BFSK sysyem.	CO2	L2	6M
	b	Explain the difference between a coherent and Non-coherent reception system.	CO3	L3	4M

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