PRESIDENCY UNIVERSITY

BENGALURU

Mid - Term Examinations – October 2025

Date: 08-10-2025   **Time:** 11.45am to 01.15pm

School: SOE	Program: ECE	
Course Code :ECE3165	Course Name: ANALOG COMMUNICATION	
Semester: V	Max Marks:50	Weightage: 25%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	23	7	15	5	

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.   **5Q x 2M=10M**

1	The modulation index plays a pivotal role in various communication systems. Define Modulation index in AM.	2 Marks	L1	CO1
2	SSB-SC version of modulation significantly reduces bandwidth and power requirements of modulated wave. Write the expression for a single side band AM wave.	2 Marks	L1	CO1
3	AM detection allows the retrieval of the original information signal from the modulated carrier. Name two types of standard AM detector.	2 Marks	L1	CO1
4	The most promising detection technique for achieving high spectral efficiency while maximizing power (or SNR) efficiency, is coherent detection. What is meant by coherent detector.	2 Marks	L1	CO1
5	Which modulation technique is most suitable for television broadcasting, where efficient bandwidth utilization is required while still allowing easy demodulation of video signals?	2 Marks	L1	CO1

Part B

Answer the Questions.   **Total Marks 40M**

6.	a.	Communication is the process of establishing a connection or link between two or more points for the exchange of information. Discuss the elements of Analog Communication	08 Marks	L2	CO1

		System with the help of a neat diagram.			
	b.	A photon of UV radiation has wavelength of 200nm. What is the frequency of this photon.	02 Marks	L3	CO 2
		Or			
7.	a.	Explain the need for modulation in communication systems. Discuss at least four reasons why direct transmission of baseband signals is not practical.	08 Marks	L2	CO 1
	b.	In the frequency domain, the analysis of AM signals reveals how the modulated signal can be understood in terms of its spectral components. Draw the spectrum of a standard AM signal.	02 Marks	L3	CO 2

8.	a.	Define amplitude modulation. What is the effect modulation index on AM signal? Derive the expression for an AM wave and show its frequency spectrum.	10 Marks	L3	CO 1, CO 3
	b.	A carrier of frequency 1 MHz is amplitude modulated by a 5 kHz signal with a modulation index of 0.5. Find the the transmitted power,` upper sideband (USB) and lower sideband (LSB) frequencies. What is the bandwidth of the AM signal?	05 Marks	L3	CO 2, CO 3
		Or			
9.	a.	Derive the mathematical expression for Double Sideband Suppressed Carrier (DSB-SC) modulation. Obtain its frequency spectrum and explain the power analysis with suitable expressions.	10 Marks	L2	CO 1, CO 3
	b.	A modulating signal $m(t)=10\ Cos(2\pi\times10^3 t)$ is amplitude modulated with a carrier signal $c(t)=50\ Cos(2\pi\times10^5 t)$. Find the modulation index, the carrier power, the power and band width required for transmitting AM wave.	05 Marks	L3	CO 2, CO 3

10.	a.	Explain Balanced modulator and coherent detection techniques for DSB-SC with relevant block diagrams.	10 Marks	L2	CO 1
	b.	Compare DSBSC and SSBSC modulation in terms of power efficiency and bandwidth requirements.	5 Marks	L4	CO 4
		Or			
11.	a.	Discuss the working of Ring modulator with the help of a neat circuit diagram to produce DSBSC signal. A carrier wave of 1 MHz is modulated by a signal of 3 kHz. Draw the spectra of DSB-SC and calculate bandwidth requirement.	10 Marks	L2	CO 1
	b.	Compare AM and DSB-SC modulation in terms of power efficiency and bandwidth requirements.	05 Marks	L4	CO 4