Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

Mid - Term Examinations – October 2025

Date: 08-10-2025 **Time:** 09.30am to 11.00am

School: SOE	**Program:** B.Tech	
Course Code : ECE2502	**Course Name**: Analog Communication	
Semester: III	**Max Marks**: 50	**Weightage**: 25%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	12	38			

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	In most of the analog communication systems, the carrier is a sinusoidal signal. What are the different characteristics that can be varied for the carrier signal so as it can accommodate the message signal?	**2 Marks**	**L1**	**CO1**
2	In a Communication system , modulation is an inevitable process. Which type of modulation varies the amplitude of a high-frequency carrier wave in proportion to the instantaneous value of the message signal, while keeping frequency and phase constant?	**2 Marks**	**L1**	**CO2**
3	In amplitude modulation systems used for radio transmission, which scheme consumes less total power for the same message signal transmission: Double Sideband Full Carrier (DSB-FC) or Double Sideband Suppressed Carrier (DSB-SC)? Justify your answer in terms of carrier power contribution.	**2 Marks**	**L1**	**CO2**
4	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**	**CO2**
5	Which modulation method is preferred in long-distance telephony and HF communication to minimize bandwidth usage and power	**2 Marks**	**L1**	**CO2**

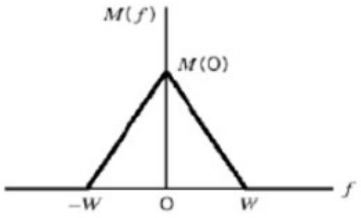
	consumption?				

Part B

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

6.	**a.**	To design a radio broadcasting system for transmitting voice signals over long distances, which fundamental communication model should be used? Draw and explain the block diagram of that analog communication system.	**10 Marks**	**L2**	**CO 1**
	b.	A communication engineer is designing a system and has to choose between DSB-FC, DSB-SC, and SSB modulation schemes. Considering both bandwidth efficiency and transmitted power requirement, compare these three schemes in detail	**10 Marks**	**L2**	**CO 2**
		Or			
7.	**a.**	Why is it not practical to transmit low-frequency audio signals (like human voice in the range of 20 Hz – 20 kHz) directly over long distances in radio communication systems? State the need for modulation.	**10 Marks**	**L2**	**CO 1**
	b.	A communication engineer is tasked with designing three types of amplitude modulation systems—DSB-FC, DSB-SC, and SSB—to transmit an audio signal $m(t)$ over a carrier of frequency *fc*. Explain the time-domain and frequency-domain representation of Amplitude Modulated signal with frequency spectrum for the same. Mention the advantages and disadvantages of Amplitude Modulation.	**10 Marks**	**L3**	**CO 2**

8.	**a.**	As a radio engineer working , with transmitting an audio signal using amplitude modulation, explain the working of any one AM modulator (DSB-FC) along with its corresponding demodulator, describe how the original message signal is recovered, and draw a neat block diagram showing the modulator, demodulator, and signal flow from the message signal to the output.	**10 Marks**	**L2**	**CO 2**
	b.	As an engineer setting up an AM radio link, explain the operation of any one AM modulator (DSB-SC) along with the corresponding demodulator, discuss how the transmitted message is recovered, and provide a neat block diagram showing the modulation-demodulation process from input to output.	**10 Marks**	**L2**	**CO 2**
		Or			

9.	**a.**	One input to AM is 500 kHz fc with Ac = 32V. Second input is 12 kHz fm, Am = 14Vp-p. Determine: USB, LSB b) μ, %μ c) Vmax, Vmin d) Draw o/p envelope e) Draw o/p frequency spectrum	**10 Marks**	**L2**	**CO 2**
	b.	A message signal m(t) with spectrum as described in fig (1) is applied to a P.M with c(t) = Ac cos(2πfct) producing the DSB-SC wave s(t). This modulated wave is next applied to a Coherent detector. Assuming a perfect coherence between Transmitter and Receiver. Determine the spectrum of detector output when: (i) fc = 1.25k (ii) fc = 0.75k (iii) Lowest fc so that m(t) is uniquely determined from s(t).  Fig 1 A triangular spectrum for m(t) centered at f = 0, extending from -f to +f, where f = 1kHz. The peak amplitude is M(f) at f = 0.	**10 Marks**	**L3**	**CO 2**