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Bengaluru

Mid Term Examinations - October 2026

Date: 08/10/2026 **Time:** 11:45 AM - 01:15 PM

Course Code: ECE2533 **Course Name:** Analog Communication

Semester: Third Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2	CO3
Marks	24	42	24

PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	Classify in detail different types Analog Communication systems.	2	CO1	BT2
2	Describe Amplitude Modulation Index. What is the value of modulation index for critical modulation condition?	2	CO1	BT2
3	Write any two types of detectors used to demodulate Amplitude Modulated signal.	2	CO2	BT3
4	Describe the expression for Frequency Modulation by defining all the parameter representations.	2	CO3	BT2
5	Discuss the difference between narrow band FM and wideband FM.	2	CO3	BT2

PART B : Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
6	Discuss in detail the elements of communication system with the help of a neat diagram block diagram. **[8 Marks]** List any two applications of AM. **[2 Marks]**	10	CO1	BT2
7	Explain the working principle of a superheterodyne (heterodyne) receiver with a neat block diagram and Describe the function of each block and derive the expression for the intermediate frequency (IF). Also discuss the advantages of the superheterodyne receiver.	10	CO1	BT2

PART C: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
8	Consider a carrier signal with frequency fc that is being frequency modulated by a message signal with frequency fm and amplitude Am. The frequency deviation of the carrier is directly proportional to the amplitude of the message signal, and the modulation index β quantifies this deviation relative to fm. How would you derive the mathematical expression for this frequency-modulated (FM) wave?	10	CO3	BT3
9	Narrowband frequency modulation (NBFM) is characterized by a small modulation index β, typically much less than 1. The spectrum of an NBFM signal consists of a carrier and two sidebands. Derive the frequency spectrum of an NBFM wave starting from its mathematical expression.	10	CO3	BT3

PART D: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
10	With a neat sketch, interpret the process of generating an amplitude-modulated (AM) wave with the help of square law and switching modulator.	10	CO2	BT3
11	An AM wave is represented by $st=10[1+0.5\cos(2\pi\times6\times10^3t]\cos(2\pi\times10^6t)$ where the carrier frequency is 2 MHz and the modulating frequency is 6 kHz Calculate the following: 1. **Carrier amplitude and modulating signal amplitude**. **(2 Marks)** 2. **Modulation index** and determine whether the wave is under-modulated, critically modulated, or over-modulated. **(2 Marks)** 3. **Upper and lower sideband frequencies**. **(2 Marks)** 4. **Bandwidth of the AM wave**. **(1 Mark)** 5. **Carrier power, total sideband power, and total transmitted power for a load resistance of 50 Ω50\,\Omega**. **(3 Marks)**	10	CO2	BT3

PART E: Answer Any 1 Following Questions. 10 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
12	With suitable block diagrams, discuss the generation and detection of a VSB-SC signal. Explain why a vestigial sideband is used and derive the expression for the bandwidth of the VSB-SC signal.	10	CO2	BT2
13	Explain the generation of a Double Sideband Suppressed Carrier (DSB-SC) signal using a balanced modulator. Draw a neat block diagram and explain its working. [5 Marks] Explain the detection of a Single Sideband Suppressed Carrier (SSB-SC) signal using a coherent detector. Draw a neat block diagram and describe the demodulation process. [5 Marks]	10	CO2	BT2