



SLOT: C2+TC2

School of Computer Science Engineering and Information Systems

Fall Semester 2024-25

Continuous Assessment Test – I

Programme Name & Branch: B.Tech – Information Technology

Course Name & Code: Principles of Communication Systems- BITE203L

Class Number (s): VL2024250103286, 3292, 3298

Faculty Name (s): Dr. Balaji E, Dr. Senthilkumar T, Dr. Bharani Dharan N

Exam Duration: 90 Min.

Maximum Marks: 50

General instruction(s):

Answer all the questions

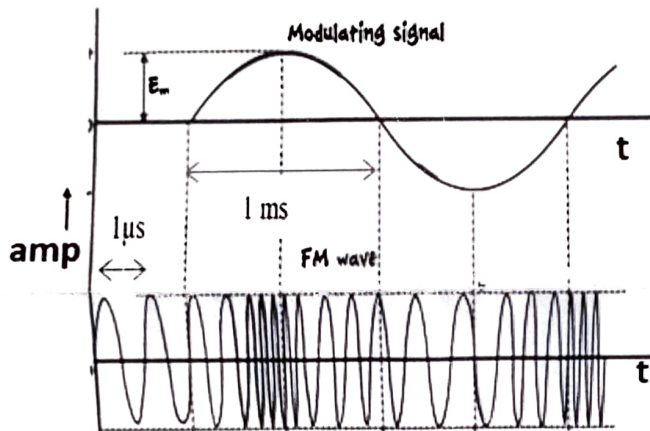
Q. No.	Question	Max Marks
1.	A sinusoidal carrier frequency of 2.5 MHz is amplitude modulated by a sinusoidal voltage of frequency 1000 Hz resulting in maximum and minimum modulated carrier amplitude of 70V and 30V respectively. Calculate, i) Bandwidth of AM signal ii) Modulation index iii) Amplitude of each sideband iv) Total power required to transmit AM signal. v) Draw the frequency spectrum of AM signal.	10
2.	a) Discuss how a square-law device can be used to demodulate an AM signal. Describe the process by which the device recovers the original modulating signal from the AM carrier. Include the key equations that represent the input and output signals of the square-law demodulator with neat diagram. b) Compare various AM variants in terms of sideband suppression, total power, bandwidth, and applications.	6 4
3.	You are an engineer tasked with designing a communication system for a fleet of unmanned aerial vehicles (UAVs) that will operate in a	10

densely populated urban environment. The UAVs need to communicate with a central control station to relay real-time data, such as video feeds and sensor readings. However, the available radio frequency spectrum is highly congested, and you must ensure that the communication system is both efficient and reliable, minimizing the risk of interference with other systems. In this context, illustrate the generation of NBFM with appropriate diagram & equations and also discuss the WBFM generation using NBFM.

4. The modulating signal and the frequency modulated signal are shown below. Consider, peak-to-peak amplitude of message and carrier signal is 10V and 20V respectively and frequency sensitivity constant is 100Hz/V.

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(Each 2 Marks)



- Calculate frequency deviation
 - Calculate the modulation index and identify the type of FM (NBFM or WBFM).
 - Identify the highest and lowest frequency component present in FM signal.
 - Draw the frequency spectrum.
 - Calculate approximate bandwidth, according to Carson's rule.
5. Analyze the design of Coherent Detector and Costas Loop to recover the message signal from the Double Side Band Suppressed Carrier signal with neat diagrams and appropriate equations.

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