VIT
Vellore Institute of Technology

Slot: G1+TC

School of Computer Science Engineering and Information Systems

Fall Semester 2023-2024

Continuous Assessment Test – I

Programme Name & Branch B. Tech - IT

Course Name & code: Principles of Communication Systems & BITE203L

Class Number (s): VL2023240102604/ VL2023240102606/ VL2023240102610

Faculty Name (s): Jerart Julus L, Senthilkumar T, Karthikeyan D

Exam Duration: 90 Min.

Maximum Marks: 50

General instruction(s): Answer all the questions

Q.No.	Question	Ma Mar
1.	One input to an AM modulator is an 800 khz carrier with a peak amplitude of 30v. The second input is a 14kHz modulating signal whose amplitude is sufficient to produce a 16v change in the amplitude of the envelope. Determine the following: a) Upper and Lower frequencies b) Modulation coefficient and percent modulation c) Maximum and minimum amplitudes of envelope d) Draw the output envelope. e) Draw the output frequency spectrum	10
2.	Derive an expression for a signal, which has a modulation index greater than one, Amplitude remains constant, and the frequency of the carrier signal is varied with respect to the modulating signal.	10
3.	a) With the help of mathematical expressions, show that a sinusoidally modulated, suppressed carrier type AM signal passed through a squaring circuit has a capability of recovering the modulating signal after passing the output of squaring circuit through low pass filter circuits.	06
	b) If a modulated wave with an average voltage of 20v changes in amplitude 5v, determine the minimum and maximum envelope amplitudes, the modulation co-efficient and percent modulation.	04
4.	a) An angle modulated wave for frequency modulation is represented by $20\cos(7.28 \times 10^6 t + 10\sin 7.283 \times 10^6 t)$. Determine i. The carrier frequency in radians/sec. ii. The modulating frequency in radians/sec. iii. The modulation index.	05

	iv. The peak frequency deviation.	
	b) A sinusoidal modulating waveform of amplitude 5v and a frequency of 2khz is applied to FM generator, which has a frequency sensitivity of 40Hz/volt. Calculate the frequency deviation, modulation index and Bandwidth.	05
5.	a) Illustrate the significant issue of thermal noise in modern electronic devices and communication systems.	06
	b) Calculate the shot noise component of the current present on the direct current of 2mA flowing across a semiconductor junction, given that the effective noise bandwidth is 2MHz.	04