



VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

REG.NO.:

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS
CONTINUOUS ASSESSMENT TEST – 1
FALL SEMESTER 2025-2026

SLOT: D2+TD2

Programme Name & Branch : B.Tech, IT
Course Code and Course Name : BITE203L, Principles of Communication Systems
Faculty Name(s) : Dr. Abhijit Bhowmick, Dr. Sanjay Kumar Singh,
Dr. Indrasen Singh, Dr. Aswathi V
Class Number(s) : VL2025260103074, VL2025260103087,
VL2025260103075, VL2025260103091
Date of Examination : 20/08/2025
Exam Duration : 90 minutes
Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M – Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- CO-1: Demonstrate the knowledge of fundamental elements and concept related to Communication System.
- CO-2: Study the various modulation techniques used in Analog Communication Systems.
- CO-3: Address the challenges imposed on different types of Communication Systems.

Answer All Questions

Q.No	Question	M	CO	BL
1.	a). What do you mean by baseband and passband transmission?	2	1	1
	b). What is the need of modulation in electronic communication system?	2		
	c). What is the condition for the proper operation of an envelope detector?	2		
	d). What do you mean by coherent detection of AM-SSB/SC? Give only block diagram.	2		
	e). Define 1% bandwidth in WBFM?	2		
2.	Consider the circuit shown in Figure 1 with an input signal, $m(t)$, an amplifier with gain K , a sinusoidal carrier signal at $2\pi f_c t$, and two nonlinear devices A and B , respectively:		2	3
	Figure 1			
	a). Express the output signal $v_o(t)$ in terms of $m(t)$, A_c , K , $\cos 2\pi f_c t$, a and b . Assume a and b as constants.	5		
	b). Determine the gain K if the circuit performs as a DSB modulator without output filtering.	5		



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3.	A carrier of frequency 1 MHz and amplitude 3 volts is frequency modulated by a sinusoidal message signal of 500 Hz and of peak amplitude 1 volt. The frequency deviation is 1 KHz. The amplitude of the message signal is changed to 5 volts, and its frequency is changed by 4 times.		2	2
	a). Write the expression for the new modulated waveform.	5		
	b). Compare the required bandwidth for both cases.	5		
4.	In a WBFM generator of Armstrong method as shown in Figure 2, the initial low frequency carrier is 200 KHz with the frequency deviation of 25 Hz and final generated frequency is 102.4 MHz and deviation at final stage is 75KHz. The mixer oscillator frequency is 10 MHz.		2	3
	Figure 2			
	a). Determine the values of frequency multipliers n_1 and n_2 .	5		
	b). Estimate the bandwidth of the WBFM signal using Carson's rule if a single tone modulating audio frequency of 5 KHz is transmitted.	5		
5.	An email spam filter analyses emails based on two features: Event A: Email contains the word "free" Event B: Email is from an unknown sender You are asked to analyse 1,000 emails and find: 300 emails contain the word "free" 400 emails are from unknown senders 150 emails satisfy both conditions (contain "free" and are from unknown senders)		3	3
	a). What is the joint probability that a randomly chosen email contains "free" and is from an unknown sender?	4		
	b). What is the probability that an email contains "free" given it's from an unknown sender?	3		
	c). Are the two events independent?	3		