VIT
Vellore Institute of Technology

SCHOOL OF ELECTRONICS ENGINEERING
Winter Semester: 2023-24
CAT- I

Programme Name & Branch: B.Tech. – Electronics and Communication Engineering
Course Name & Code: Analog Communication Systems & BECE304L
Class Numbers: VL20232405013l6,1313,1302,1307, 1310,1322,1319,1305
Slot: G1 + TG1
Faculty Name (s): Dr. Vijendra Babu D, Dr.K.V.N.Kavitha,Dr.Rajesh R , Dr. Sangeetha A, Dr.Aarthi G, Dr.Veerapu goutham,Dr. Indrasen singh,Dr.Shankar T
Exam Duration: 90 Min. **Maximum Marks:** 50

General instruction(s): Scientific Calculators are permitted

Q.No.	Question	Max. Marks	CO	BL
1.	(a) Differentiate between baseband & passband transmission with sufficient block diagram of analog communication systems. Explain the functions of each block.	5	CO1	BL2
	(b) Find the practicability of the antenna for the transmission of voice signal at carrier frequency of 2000 Hz and 100 MHz. Estimate the antenna height considering a di-pole Antenna.	5	CO1	BL2
2.	The equation of Amplitude modulated wave is given by, $s(t) = 10\cos(2\times10^6\times\pi t) + 3\cos(2004\times10^3\times\pi t) + 3\cos(1996\times10^3\times\pi t)$. Determine the following i) Carrier power, total sideband power, total power required to transmit AM wave & modulation efficiency. ii) Draw the double-sided spectrum & compute bandwidth.	6 4	CO2	BL2
3.	Obtain an expression for the signal $V_3(t)$ in the following Figure 1 for $V_1(t) = 5\cos(400\pi t) + 2\sin(1000\pi t)$. Assume that $V_2(t) = (2 + V_1(t))^2$ and that the BPF is an ideal unity gain filter with pass band from 400 Hz to 600 Hz. Also sketch the spectral amplitude characteristics of the output waveform $V_3(t)$ in the frequency range 400 Hz $\leq f \leq$ 600 Hz. **Figure 1**	10	CO2	BL2

4.	(a) A carrier signal $c(t)=20\cos(2\pi 10^6 t)$ is modulated by a message signal $m(t)= 5\cos(8\pi 10^3 t) + 2\cos(2\pi 10^4 t)$ to generate a DSB-SC signal. sketch the double sided spectrum, calculate bandwidth and total power. (b) An SSB signal is generated by modulating a carrier of $20\cos 10^6 \pi t$ by the message signal $m(t)= \sin 3000\pi t + 3\cos 4000\pi t$. i. Determine the Hilbert transform of the message signal ii. Find the Time-domain expression for the Lower sideband and Upper sideband of the SSB signal.	5 5	CO2 CO2	BL2 BL2
5.	Explain the generation of SSB-SC wave with neat diagram and derive an expression using weavers method.	10	CO2	BL2