

National Institute of Technology, Delhi

Name of the Examination: B. Tech 2nd year (Mid Semester), 2023

Branch : ECE

Semester: 4th

Title of the Course: Analog Communication

Course Code: ECB-253

Time: 1.5 Hours

Maximum Marks: 25

COURSE OUTCOMES		COGNITIVE LEVELS
CO1	Introduction of communication system and analyze the signal representation using Fourier transform	Understanding (Level II)
CO2	Introduction of various amplitude modulation and demodulation schemes and analyzing their spectrum using Fourier transform.	Analyzing (Level IV)
CO3	Analyze the various generation and detection methods of narrow and wideband frequency modulation.	Analyzing (Level IV)
CO4	Understand the working principle of tuned radio receiver like super heterodyne and their study of its spectral features	Evaluating (Level V)
CO5	Understand the concepts of pulse modulation, Sampling Theorem, Pulse amplitude modulation (PAM), PWM	Understanding (Level II)

Course Outcomes(CO's)	CO1	CO2	CO3
Questions No.	Q4	Q1, Q3	Q2, Q5

Note: Attempt all questions

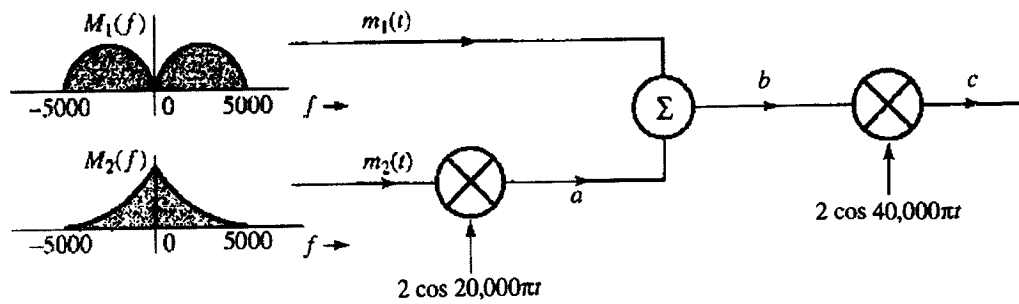
(5×5=25)

Q. 1 Draw and explain the circuit diagram for generating double sideband suppressed carrier modulated signal (DSB-SC) using a nonlinear modulator.

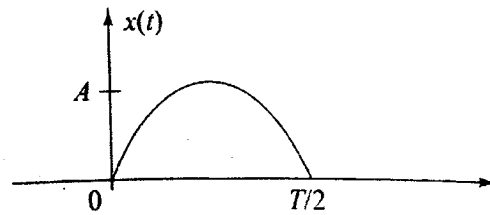
Q.2 Write a short note on following

(a) Capture effect (b) Quadrature null effect

Q.3 The system shown below is used for scrambling audio signals. Draw the waveform at the point *a*, *b*, and *c* shown in figure below.



Q.4 Find the Fourier transform of the given waveform.



Q.5 An angle modulated signal is given by $\phi_{EM}(t) = 10 \cos 13000\pi t$, where carrier frequency $\omega_c = 1000\pi$.

- If the given signal is phase modulated with $K_p = 1000$, determine $m(t)$.
- If the given signal is frequency modulated with $K_f = 1000$, determine $m(t)$.