Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- V EXAMINATION-SUMMER 2023

Subject Code: 2151004 Date: 30/06/2023

Subject Name: Electronics and Communication

Time: 02:30 PM TO 05:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

Q.1	**(a)**	Find the Fourier transform of e^{-at} u(t).	**07**
	(b)	Draw the block diagram of basic communication system and explain it.	**07**
Q.2	**(a)**	What is Q-Factor of a series resonance circuit? Explain the bandwidth of series resonance circuit and effect of Q on bandwidth.	**07**
	(b)	Draw and explain waveform of the DSB-FC modulation.	**07**
		OR	
	(b)	Define and draw the unit gate function rect(x). Find the inverse Fourier transform of $\delta(\omega - \omega_0)$.	**07**
Q.3	**(a)**	Obtain the time domain equation of AM wave. Discuss modulation index and bandwidth of AM wave.	**07**
	(b)	Explain the Armstrong method of FM generation.	**07**
		OR	
Q.3	**(a)**	Explain the double-sided frequency spectrum of AM wave. If modulating signal frequency 15 kHz and carrier frequency is 2 MHz, determine USB and LSB frequency component.	**07**
	(b)	Explain the phase shift method for SSB generation.	**07**
Q.4	**(a)**	Explain the modulation index and frequency spectrum of FM wave.	**07**
	(b)	Discuss the working of simple slope detector circuit for FM demodulation.	**07**
		OR	
Q.4	**(a)**	How PM signal can be generated using FM modulator? Compare the FM and PM system.	**07**
	(b)	What is signal to noise ratio (SNR)? Explain the SNR of Tandem connection.	**07**
Q.5	**(a)**	Draw and explain the block diagram of tuned radio frequency receiver. Discuss the disadvantages of this receiver.	**07**
	(b)	What is intermediate frequency (IF) in receiver? Explain the following terms: Fidelity and Image Frequency.	**07**
		OR	
Q.5	**(a)**	What are the natural sources of noise? Explain thermal noise in brief.	**07**
	(b)	What is ham radio? Explain the importance this technology during natural calamities.	**07**

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