Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI EXAMINATION – SUMMER 2025

Subject Code: 3161005 Date:22-05-2025

Subject Name: Fiber Optic Communication

Time: 10:30 AM TO 01:00 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.**

			MARKS
Q.1	**(a)**	Describe Fiber structure with neat diagram.	**03**
	(b)	Compare Graded index fiber with Step index fiber.	**04**
	(c)	Define following: 1) Normalized frequency of fiber, 2) Mode volume for step index fiber, 3) Mode volume for graded index fiber, 4) Critical angle,5) Total internal reflection, 6) Index difference,7) Numerical Aperture.	**07**
Q.2	**(a)**	State and explain Snell's law.	**03**
	(b)	Compare Single-mode fiber with Multi-mode fiber.	**04**
	(c)	Explain and Draw block diagram of Optical fiber communication and mention functions of each block.	**07**
		OR	
	(c)	Discuss advantages and disadvantages of Optical link over conventional Copper system.	**07**
Q.3	**(a)**	What is Inter Symbol Interference? How it can be eliminated?	**03**
	(b)	Explain scattering loss in optical fiber.	**04**
	(c)	Compare LED with LASER, and give merits and demerits of both. Mention materials used in both.	**07**
		OR	
Q.3	**(a)**	Explain three operating window of fiber optics communication.	**03**
	(b)	Discuss the following for optical fibers: 1) Absorption 2) Rayleigh Scattering	**04**
	(c)	What are bending losses in optical fiber? Describe: 1) Micro bending losses, 2) Macro bending losses.	**07**
Q.4	**(a)**	List the most common type of mechanical mis alignment occurring between two joined fibers. Explain in brief anyone.	**03**
	(b)	Explain following terms: 1) Power launching, 2) Coupling efficiency.	**04**
	(c)	Explain working of RAPD with appropriate sketch.	**07**
		OR	
Q.4	**(a)**	Explain population inversion.	**03**
	(b)	Differentiate between P-I-N and Avalanche photodiodes.	**04**
	(c)	List various optical fiber splicing technique. Explain any one technique in brief.	**07**
Q.5	**(a)**	Discuss the Wavelength division multiplexing in brief.	**03**
	(b)	How does Raman amplifier work?	**04**

	(c)	Write short notes on Synchronous optical fiber networks (SONET).	**07**

OR

Q.5	**(a)**	List the key transition processes involved in laser action. Explain any one in brief.	**03**
	(b)	Describe the principle used in the photo detector.	**04**
	(c)	State methods for dispersion measurement in laboratory. Explain the experimental setup for one of them.	**07**

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