Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2025

Subject Code:3170314 Date:27-05-2025

Subject Name:LASER and Fiber Optics in Medical Technology

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.**

			MARKS
Q.1	**(a)**	What is light guiding? Explain with some examples.	**03**
	(b)	Draw and explain simple fiber optic system.	**04**
	(c)	Explain Snell's law with diagram and equation.	**07**
Q.2	**(a)**	Explain critical angle and its importance in communication.	**03**
	(b)	What is windowing? Explain how to select a specific window for optical transmission.	**04**
	(c)	What is the use of decibel in fiber optic circuits? Explain with example.	**07**
		OR	
	(c)	Explain the phenomenon of absorption in fiber optics.	**07**
Q.3	**(a)**	Explain 1) Cone of acceptance 2) Numerical aperture 3) Fiber optics	**03**
	(b)	What is acceptance angle? Explain with its equation.	**04**
	(c)	What is Rayleigh scattering? Explain Fresnel reflection.	**07**
		OR	
Q.3	**(a)**	Explain the use of fiber optic pressure sensor.	**03**
	(b)	Explain different bending losses associated with optical fiber with proper illustrations.	**04**
	(c)	What is dispersion? What is the effect of dispersion on the data transmission?	**07**
Q.4	**(a)**	What is mode? How modes can be calculated within optical fiber.	**03**
	(b)	Differentiate between ordinary light and LASER light.	**04**
	(c)	Write a note on: Applications of LASERs in diagnosis of cancer.	**07**
		OR	
Q.4	**(a)**	Draw and explain block-diagram of LASER system.	**03**
	(b)	Explain structure of endoscope with its major parts.	**04**
	(c)	Explain clinical applications of LASER with specialty and LASER used.	**07**
Q.5	**(a)**	Explain LASER hyperthermia.	**03**
	(b)	Discuss optical properties of tissues.	**04**
	(c)	Write a note on: Applications of LASERs in Detection of Plaque in Cardiology.	**07**
		OR	
Q.5	**(a)**	Discuss the beam divergence and beam focusing.	**03**
	(b)	Explain non-thermal interaction of LASER with tissues.	**04**
	(c)	Write a note on Nd: YAG LASER.	**07**

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