

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2021****Subject Code:2161005****Date:07/08/2021****Subject Name:Optical 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.

		MARKS
Q.1	(a) Mention the advantages of optical fiber communications.	03
	(b) Explain elastic tube techniques for fiber splicing.	04
	(c) How acceptance angle is related to the fiber numerical aperture? Explain with the use of ray theory.	07
Q.2	(a) “ The optical power launched into a fiber does not depend on the wavelength of the source but only on it’s brightness” Justify	03
	(b) Briefly Describe the block diagram of Optical Communication Systems.	04
	(c) Write short notes on Synchronous optical fiber networks(SONET)	07
OR		
	(c) Derive the equation for the power launched from LED Source in to a S.I. fiber.	07
Q.3	(a) Define the following terms related to photo detector. (i) Responsivity (ii) Quantum efficiency (iii) Cut off Wavelength.	03
	(b) What is meant by attenuation of signal in fiber cable? How this loss can be measured?	04
	(c) Discuss Optical Time Domain Reflectometry in detail.	07
OR		
Q.3	(a) Explain stimulated emission mechanism.	03
	(b) Explain block diagram of optical communication system with neat sketch and mention functions of each block.	04
	(c) Discuss optical power loss model for a point to point link.	07
Q.4	(a) Explain equilibrium numerical aperture.	03
	(b) List the different types of lensing schemes used in optical system and Explain them in detail.	04
	(c) A multimode step index fiber with a core diameter of 80 μm and a relative index difference of 1.5% is operating at a wavelength of 0.85 μm . If the core refractive index is 1.48, calculate: (i) Normalized frequency of fiber (ii) Total number of guided modes.	07
OR		
Q.4	(a) Explain three operating window of fiber optics communication.	03
	(b) Explain the basic principles of WDM and DWDM with respect to optical fiber system.	04
	(c) Discuss the various dispersion mechanisms that contribute to pulse broadening during the fiber transmission.	07

- Q.5** (a) Explain OVPO method of fiber fabrication. **03**
(b) Describe the architecture and amplification mechanism of Erbium Doped Fiber Amplifier. **04**
(c) Briefly explain the principal of optical detection. Discuss the major advantages of APD over P-i-n photodiode. **07**

OR

- Q.5** (a) Give the comparison of S.I. and G.I. fibers. **03**
(b) Discuss the intermodal dispersion mechanisms that contribute to pulse broadening during the fiber transmission. **04**
(c) With reference to LED, explain how to achieve. **07**
 a) a high radiance and high quantum effect
 b) carrier and optical confinement.
