Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(OLD) – EXAMINATION – SUMMER 2019

Subject Code:161005 Date:14/05/2019

Subject Name: Optical 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.**

Q.1	**(a)**	Explain the advantages of the optical communication system using optical fiber over conventional copper system as a transmission link. State the optical transmission windows.	**07**
	(b)	Define the following.(draw necessary figures and write equations if any) i) Population Inversion ii) Total internal reflection iii) Acceptance angle	**07**
Q.2	**(a)**	Explain double crucible arrangement for drawing fibers from molten glass. Draw necessary figure.	**07**
	(b)	A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and a cladding refractive index of 1.47 Determine: (i) The critical angle at the core cladding interface. (ii)The N.A. for the fiber (iii) The acceptance angle in air for the fiber.	**07**
		OR	
	(b)	A multimode step index fiber with a core diameter of 80µm 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 the normalized frequency for the fiber and the number of guided modes. Also compute the power in the clad if the total input power is 500 mw.	**07**
Q.3	**(a)**	Discuss optical power loss model for a point to point link.	**07**
	(b)	Make a comparison of LED and LASER diode as a light source in fiber optic communication.	**07**
		OR	
Q.3	**(a)**	Explain different types of fiber according to structure and also compare them.	**07**
	(b)	Discuss briefly the distributed feedback LASER with neat sketch.	**07**
Q.4	**(a)**	Discuss the fiber splicing techniques with neat sketches.	**07**
	(b)	Explain Erbium Drop Fiber Power amplifiers(EDFAs)	**07**
		OR	
Q.4	**(a)**	Explain detection process in the p-i-n photodiode. Define the quantum efficiency & responsivity of a photo detector.	**07**
	(b)	What is optical coupler? Draw and explain optical coupler in detail.	**07**
Q.5	**(a)**	Write short notes on Syncronous optical fiber networks(SONET)	**07**
	(b)	Explain intramodal and intermodal dispersion in details.	**07**

OR

Q.5	**(a)**	Explain Optical Time Domain Reflectometry (OTDR) method with its benefits over other techniques.	**07**
	(b)	Discuss Wavelength division Multiplexing and EYE Pattern/ Diagram and in brief.	**07**

****