Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–V EXAMINATION – WINTER 2015

Subject Code:X51102 Date:12/12/2015

Subject Name: Optical Communication

Time: 10:30pm to 1:00pm 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)**	The refractive indices of core and cladding materials of a step index fiber are 1.48 and 1.45 respectively. Calculate (i) Numerical aperture, (ii) acceptance angle, (iii) the critical angle at the core-cladding interface, and (iv) fractional refractive indices change.	**07**
	(b)	Consider a multimode step index fiber with a 62.5 μm core diameter and a core-cladding index difference of 1.5%. If the core refractive index is 1.480, estimate the normalized frequency of the fiber and the total number of modes supported in the fiber at a wavelength of 850nm.	**07**
Q.2	**(a)**	Compare optical cables with copper cables.	**07**
	(b)	Compare Ray theory and Electromagnetic mode theory for light propagation through fiber.	**07**
		OR	
	(b)	Justify. “Graded index fibers have much larger bandwidth and data transmission capabilities than Step index fibers.”	**07**
Q.3	**(a)**	Explain the principle, characteristics and operation of Avalanche photodiode.	**07**
	(b)	List the types of Light Emitting Diodes used in optical system and explain any one of them with required figure.	**07**
		OR	
Q.3	**(a)**	Draw a summary chart showing different signal degradations in optical fibers.	**07**
	(b)	Discuss briefly the distributed-feedback(DFB) laser diode with neat sketch.	**07**
Q.4	**(a)**	What are Eye diagrams? Explain different eye pattern features with diagrams.	**07**
	(b)	Explain (1) fusion splicing, (2) V-grove splicing.	**07**
		OR	
Q.4	**(a)**	Write the differences between LEDs and LASERs.	**07**
	(b)	Discuss optical power loss model for a point to point link.	**07**
Q.5	**(a)**	Explain Optical Time Domain Reflectometry (OTDR) method with its benefits over other techniques.	**07**
	(b)	Write short notes on Synchronous Optical Fiber Networks(SONET).	**07**
		OR	
Q.5	**(a)**	Explain Semiconductor Optical Amplifiers (SOAS).	**07**
	(b)	Write a brief note on Optical Couplers.	**07**

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