Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2161005 **Date:17/05/2016**

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)**	Briefly Explain the block diagram of Optical Communication Systems and also mention the advantages of optical fiber communication.	**07**
	(b)	With figure explain the plasma activated chemical vapor deposition (PCVD) technique for the production of optical fiber.	**07**
Q.2	**(a)**	Derive the equation for the power launched from LED Source in to a S.I. fiber.	**07**
	(b)	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	
	(b)	(i) What is equilibrium numerical aperture? Give the significance of the same. (ii) A step index fiber has n_{core}=1.44 and n_{clad}= 1.40 find (1) The N.A. (2) Delta (3) The acceptance angle.	**07**
Q.3	**(a)**	Discuss optical power loss model for a point to point link.	**07**
	(b)	What are bending losses in fiber optic communication? Describe: (i) Micro bending losses. (ii) Macro bending losses.	**07**
		OR	
Q.3	**(a)**	List the types of Light Emitting Diodes used in optical system and explain any one of them with required figure.	**07**
	(b)	Discuss briefly the distributed feedback LASER with neat sketch.	**07**
Q.4	**(a)**	Explain intramodal and intermodal dispersion in details.	**07**
	(b)	Explain detection process in the p-i-n photodiode. Define the quantum efficiency & responsivity of a photo detector.	**07**

OR

Q.4	**(a)**	A Silicon APD has a quantum efficiency of 75 % at a wavelength of 900 nm. If 0.5 mw of optical power produces a multiplied photo current of 10 mA, then what is avalanche gain for this device?	**07**
	(b)	(i) Give the comparison of S.I. and G.I. fibers. (ii) Give the comparison of S.M. and M. M. fibers	**07**
Q.5	**(a)**	Write short notes on Synchronous optical fiber networks (SONET).	**07**
	(b)	Explain the principle of operation of (i) EDFA (ii) Wavelength division multiplexing.	**07**

OR

Q.5	**(a)**	What is optical coupler? Draw and explain optical coupler in detail.	**07**
	(b)	Draw and explain set ups for the measurements of the dispersion.	**07**

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