Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER-1 (NEW) EXAMINATION – WINTER 2016

Subject Code: 2710503 **Date:07/01/2017**

Subject Name: Fiber Optic Communication

Time: 2:30 pm to 5:00 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 reasons for pulse broadening due to material dispersion in Optical fibers. Also derive the equation for group delay τ_g in an optical fiber.	**07**
	(b)	Write a short note on WDM.	**07**
Q.2	**(a)**	Describe the techniques employed and the fiber structures utilized to provide: (a) dispersion-shifted single-mode fibers; (b) dispersion-flattened single-mode fibers. (c) nonzero-dispersion shifted single-mode fibers.	**07**
	(b)	What is the function of optical amplifier? Explain advantage and disadvantage of it.	**07**
		OR	
	(b)	Explain SONET frame structure.	**07**
Q.3	**(a)**	Explain Fabry Perot cavity lasers and its mode with appropriate diagram.	**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, estimate: (a) the normalized frequency for the fiber; (b) the number of guided modes.	**07**
		OR	
Q.3	**(a)**	Derive threshold condition Laser diode (rate equation).	**07**
	(b)	Compare the electrical and optical bandwidths for an optical fiber communication System and develop a relationship between them.	**07**
Q.4	**(a)**	Explain Mach-Zehnder Interferometers application and operation.	**07**
	(b)	Factors affect of rise time budget and give relation of rise time system and bandwidth with example.	**07**
		OR	
Q.4	**(a)**	What is impact ionization? Explain RAPD in brief.	**07**
	(b)	Explain EDFA with neat sketch.	**07**
Q.5	**(a)**	Explain what is meant by self-phase modulation. Discuss a major application area for this nonlinear phenomenon.	**07**
	(b)	Explain Pre-compensation Schemes, Post-compensation Schemes for Dispersion Management.	**07**
		OR	
Q.5	**(a)**	Compare Stimulated Brillouin Scattering and Simulated Raman Scattering nonlinear effect.	**07**
	(b)	What is Kerr effect? Explain nonlinear phenomenon of Cross Phase Modulation.	**07**

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