Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME SEMESTER – I (NEW) EXAMINATION – SUMMER 2017

Subject Code:2710503 **Date:12/05/2017**

Subject Name: Fiber Optic Communication

Time:02:30 P.M. to 05:00 P.M. **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)**	Why optical fibers are so good for communication? Briefly explain any one application of optical fiber	**07**
	(b))	Distinguish: (i) Step-index and Graded index fibers. (ii) Single mode fiber and Multi mode fiber	**07**
Q.2	**(a)**	Light travelling in air strikes a glass plate at an angle $\Theta 1 = 33°$, where $\Theta 1$ is measured between the incoming ray and the glass surface. Upon striking the glass, part of the beam is reflected and part is refracted. If the refracted and reflected beams makes an angle of 90° with each other, what is the refractive index of the glass? What is the critical angle for this glass?	**07**
	(b)	A step index multimode fiber with a numerical aperture of 0.20 supports approximately 1000 modes at an 850 nm wavelength. (i) What is the diameter of this core? (ii) How many modes does the fiber support at 1320 nm? (iii) How many modes does the fiber support at 1550 nm?	**07**
		OR	
	(b)	Explain setup for a Raman Amplification System.	**07**
Q.3	**(a)**	Explain linear scattering losses in optical fiber.	**07**
	(b)	Explain desirable characteristics of good optical source and good detector.	**07**
		OR	
Q.3	**(a)**	Explain various LED efficiencies. Derive equations for responsivity.	**07**
	(b)	Compare : (i) LED & LASER (ii) Spontaneous & Stimulated emission (iii) P-I-N photo diode & Avalanche Photodiode.	**07**
Q.4	**(a)**	Explain: (i) Dispersion shifted fiber (ii) Optical connector (iii) Population inversion	**07**
	(b)	Derive expression of Link Loss Budget - Power budget and time budget and explain BER Optical Power Penalties.	**07**
		OR	
Q.4	**(a)**	Discuss absorption losses in optical fibers, comparing and contrasting the Intrinsic and extrinsic absorption mechanisms.	**07**
	(b)	Write a short note on :(i) Fiber Bragg Gratings (ii) PMD compensation	**07**

Q.5	**(a)**	What is the function of optical amplifier? Explain advantage and disadvantage of it. How it differs from repeater.	**07**
	(b)	What do you mean by optical splicer? Describe various optical splicing Techniques.	**07**

OR

Q.5	**(a)**	Write a short note on WDM Network Elements.	**07**
	(b)	Explain in detail protection schemes used in SONET/SDH Network.	**07**

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