Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (NEW).EXAMINATION – WINTER 2016

Subject Code: 2161005 **Date: 26/10/2016**

Subject Name: Optical Communication

Time: 02:30 PM to 05:00 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)** Discuss the evolution of optical communication system. **07**

(b) What is the major advantage of glasses for optical fiber using vapour phase deposition techniques? Brief about various vapour phase deposition techniques used currently. **07**

Q.2 **(a)** A step index optical fiber has a numerical aperture of 0.3 and a cladding refractive index of 1.5. Determine **07**

1. The acceptance angle of fiber in water which has a refractive index of 1.33.
2. The critical angle of core cladding interface.
3. Number of modes transmitted at 1300 nm wavelength and 20 µm is core radius.

(b) List the Optical Amplifiers in Optical system. Explain Raman amplifier in detail. **07**

OR

(b) Explain Optical add drop multiplexer in detail. **07**

Q.3 **(a)** The mean optical power launched into 6 km length of fiber is 100 µw, the mean optical power at the fiber output is 4 µw. Determine **07**

i. Overall signal attenuation or less in decibels through the fiber.
ii. The signal attenuation per kilometer for fiber.
iii. The overall attenuation for 20 km optical link using the same fiber with connectors at 1 km each giving an attenuation of 1 dB.

(b) Describe in brief about Synchronous Optical Fiber Networks (SONET). **07**

OR

Q.3 **(a)** Discuss about nonlinear and linear scattering losses taking place in fiber. **07**

(b) Draw and Explain set ups for the measurements of the attenuation. **07**

Q.4 **(a)** Explain the optical source LASER along with its principle and expression. **07**

(b) List the types of photo detector used in optical system and explain structure and operating principle of any one in detail. **07**

OR

Q.4 **(a)** Write in short on comparison of LED and LASER diode as a light source in fiber optic communication. **07**

(b) Write in detail about losses in fiber due to misalignment. Also mention its reason and effects. **07**

Q.5 **(a)** Draw optical power loss model and mention the procedure to calculate link power Rise time budget. **07**

(b) Explain Optical Time Domain Reflectometry (OTDR) method with its benefits over other techniques. **07**

OR

Q.5	**(a)**	Discuss the characteristic of photodiode along with all key term. Also mention about response time of photo diode.	**07**
	(b)	Discuss system features of WDM and explain WDM in brief also Draw diagram of a typical WDM link containing various components.	**07**

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