

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI (NEW) - EXAMINATION – SUMMER 2017****Subject Code: 2161005****Date: 08/05/2017****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.

		<b>MARKS</b>
<b>Q.1</b>	<b>Short Questions</b>	<b>14</b>
	1 Mention difference between DB and DBm.	<b>01</b>
	2 What is meant by Population Inversion in laser operation?	<b>01</b>
	3 Mention : Snell's Law	<b>01</b>
	4 Define : (1) Acceptance angle (2) Critical angle	<b>01</b>
	5 What is meant by power budget for fiber optic system?	<b>01</b>
	6 Define : Scattering Loss in fiber cable	<b>01</b>
	7 Differentiate between Homojunction and Heterojunction materials.	<b>01</b>
	8 Define: Total internal reflection occurred in fiber cable waveguide.	<b>01</b>
	9 Justify that glass fiber is preferred then plastic fiber.	<b>01</b>
	10 Define: Refractive index of material.	<b>01</b>
	11 List out the requirements of cladding over core for fiber cable	<b>01</b>
	12 Differentiate between direct and indirect band gap materials.	<b>01</b>
	13 Define : Skew rays in fiber waveguide	<b>01</b>
	14 List out the function of optical repeater.	<b>01</b>
<b>Q.2</b>	(a) Discuss the need of fiber optical communication System.	<b>03</b>
	(b) Describe in brief : Numerical Aperture	<b>04</b>
	(c) Describe the function of each element used in optical fiber transmission link with neat block diagram.	<b>07</b>
	<b>OR</b>	
	(c) The velocity of light in core of step index fiber is $2.01 \times 10^8$ m/s and the critical angle of core cladding interface is $80^\circ$ . Determine the numerical aperture and acceptance angle for the fiber in air assuming that it has core diameter suitable for consideration in ray analysis.	<b>07</b>
<b>Q.3</b>	(a) List out advantages of graded index fiber	<b>03</b>
	(b) Differentiate between step index and graded index fiber.	<b>04</b>
	(c) Describe the Modified Chemical Vapour deposition Technique for fabrication of fiber cable using neat diagram.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) What is meant by attenuation of signal in fiber cable? How this loss can be measured?	<b>03</b>
	(b) Differentiate between Micro and Macro bending losses in fiber cable with neat diagram.	<b>04</b>
	(c) Discuss surface Emitting LED with neat diagram and also discuss comparison with Edge Emitting LED.	<b>07</b>
<b>Q.4</b>	(a) Discuss the Wavelength division Multiplexing in brief.	<b>03</b>
	(b) List out comparisons between LED and LASER.	<b>04</b>
	(c) Describe the operations of LASER diode.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Differentiate between Single and Multimode fibers.	<b>03</b>
	(b) Discuss the EYE Pattern/ Diagram in brief	<b>04</b>

- (c) List out the advantages of fiber cable over copper cable in detail. **07**
- Q.5** (a) Describe the principle used in Photo detector **03**  
(b) Discuss the fiber splicing techniques with neat sketches. **04**  
(c) Discuss the need of optical Amplifier and also describe the architecture and amplification mechanism of Erbium Doped Fiber Amplifier. (EDFA). **07**
- OR**
- Q.5** (a) Explain the PIN photo diode operation in detail. **03**  
(b) Describe in brief : Dispersion in fiber cable **04**  
(c) Discuss the various lensing schemes in details for coupling improvement. **07**

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