| Seat No.: | Enrolment No. |
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**Subject Code:161005** 

## GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI EXAMINATION – WINTER 2015

Date:10/12/2015

| Tiı | me:2<br>tructio | Attempt all questions.  Make suitable assumptions wherever necessary.   |          |
|-----|-----------------|---|----------|
| Q.1 | (a)<br>(b)      | Explain the evolution of fiber optic systems with necessary diagrams.  Mention the advantages and limitations of optical fiber link over conventional copper systems link.  | 07<br>07 |
| Q.2 | (a)<br>(b)      | Consider a multimode fiber that has a core refractive index of 1.480 and a core-<br>cladding index difference 2%. Find the (a) numerical aperture, (b) the<br>acceptance angle, and (c) the critical angle.<br>Explain the electromagnetic mode theory for light propagation through fiber. | 07<br>07 |
|     | <b>(b)</b>      | OR  Justify. "Graded index fibers have much larger bandwidth and data transmission capabilities than Step index fibers."  | 07       |
| Q.3 | (a)<br>(b)      | Discuss the various dispersion mechanisms that contribute to pulse broadening during the fiber transmission.  List the types of Light Emitting Diodes used in optical system and explain any one of them with required figure.  | 07<br>07 |
| Q.3 | (a)<br>(b)      | OR Discuss briefly the distributed-feedback(DFB) laser diode with neat sketch. Explain the principle, characteristics and operation of avalanche photodiode.  | 07<br>07 |
| Q.4 | (a)<br>(b)      | Compare LEDs and LASERs.  Discuss optical power loss model for a point to point link.  OR   | 07<br>07 |
| Q.4 | (a)<br>(b)      | How amplification is achieved in (1) EDFA (2) Raman Amplifier. Write a short note on fiber connectors.  | 07<br>07 |
| Q.5 | (a)<br>(b)      | Write a brief note on Optical Couplers. What is splicing? Explain different techniques of splicing.  OR   | 07<br>07 |
| Q.5 | (a)<br>(b)      | Explain Optical Time Domain Reflectometry (OTDR) method with its benefits over other techniques.  Write short notes on Synchronous Optical Fiber Networks(SONET)  | 07<br>07 |

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