

(3 Hours)

TOTAL MARKS: 80

**N.B: (1) Question No.1 is COMPULSORY**

**(2) Attempt any three questions from remaining questions**

**(3) Figures to the right indicate full marks**

1. (a) Define Spontaneous Emission , Stimulated Emission and Quantum Efficiency 5  
 (b) Define Cross talk and Solitons 5  
 (c) What is OTDR. Draw its response graph with details. 5  
 (d) Explain three operating windows in optical communication 5
  
2. (a) What are the desirable requirements of a good fiber optic connector? What are the lensing schemes for coupling improvements? 10  
 (b) List different types of fiber fabrication techniques and explain any one of them. 10
  
3. (a) Explain different types of Front End Amplifier in Optical Receiver. 7  
 (b) Differentiate PIN and APD. Derive an expression for Responsivity of PIN diode. 8  
 (c) Explain Link Budget Analysis in Optical Communication 5
  
4. (a) Differentiate Intermodal and Intramodal Dispersion. Derive an expression for Pulse Spreading in Intermodal Dispersion. 10  
 (b) Consider a Graded Index Multimode Fiber for which the index profile  $\alpha=2.0$ , the core index  $n_1=1.480$ , the core cladding index difference  $\Delta=0.01$  and core radius  $a=25\mu\text{m}$ . If the radius of curvature of the fiber is  $R=1\text{cm}$ , What percentage of the modes remain in the fiber at a  $1300\text{nm}$  wavelength? 10
  
5. (a) What is Four Wave Mixing? Explain in brief WDM in optical communication 10  
 (b) Explain in detail structure of SONET/SDH network. 10
  
6. Write a short note on any two 20  
 (a) OTDM  
 (b) Optical Access Network  
 (c) Fault Management  
 (d) Wavelength Stabilization

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