

[Time: 3 Hours]

[Total Marks: 80]

Please check whether you have got the right question paper.

- N.B:**
- 1) Question No. 1 is **compulsory**
 - 2) Attempt any **Three (03)** Questions from remaining **Five (05)** Questions.
 - 3) Assume suitable data where ever necessary.

Q. 1 Attempt the following Questions (**any 4**)

- a) Draw the refractive index profile with dimensions of different types of fiber. **5**
- b) Explain linearity polarized modes. **5**
- c) Describe the eye diagram as applicable to optical fiber communication. **5**
- d) With the help of neat sketch, explain the working of optical isolator **5**
- e) Distinguish spontaneous and stimulated emission. **5**
- f) What is Optical Transport network (OTN)? **5**

- Q. 2 a) Compare step index fiber and graded index fiber.; Derive the expression for Numerical Aperture of a step-index fiber. What will happen to Numerical Aperture if cladding is removed? **10**
- b) Find core radius necessary for single mode operation at 820nm of step index fiber with $n_1=1.482$ and $n_2=1.474$. What is the numerical aperture and maximum acceptance angle of this fiber? Calculate the corresponding solid angle. **10**

- Q. 3 a) Explain with neat sketch the two categories of front end amplifiers, Discuss the possible sources of noise in optical fiber receiver. **10**
- b) What do you understand by intermodal dispersion? Derive the expression for material dispersion Explain with neat diagram. Explain how to minimize micro bending losses. **10**

- Q. 4 a) Compare coherent and non-coherent detection. Explain the bit error rate of optical receiver and receiver performance. **10**
- b) Generic configuration of typical SONET or SOH Network What are the Network Categories? Give the names of public Network established. **10**

- Q. 5 a) Explain OTDR with neat sketch and mention its advantages and applications. **10**
- b) Explain with components a typical WDM link in detail & Give the details of network management in a typical optical network. **10**

Q. 6 Write short note on (**any 4**) :- **20**

- a) Mode coupling.
- b) State difference between LED and LASER.
- c) Link power budget.
- d) connectors used in optical fiber communication
- e) Network topologies.