

Q.P. Code : 629602

(3 Hours)

[ Total Marks : 100

- N.B. :** (1) Question No.1 is compulsory.  
(2) Attempt any four questions from remaining six questions.  
(3) Assume suitable data wherever necessary, justify the same.  
(4) Figures to the right indicate full marks.

1. Answer the following in brief: 20
- (a) What are the advantages of optical fiber communication?
  - (b) Distinguish between spontaneous and stimulated emissions.
  - (c) Coherent optical communication is preferred over non-coherent optical communication why?
  - (d) Derive expression for the responsivity of an intrinsic photodetector in terms of quantum efficiency and wavelength.
2. (a) Explain the significance of 'V' number. Derive the expression for number of guided modes in graded index fiber. 10
- (b) Explain intramodal and internodal dispersion. How does dispersion affect the transmission bandwidth of optical fiber. 10
3. (a) A multimode step index fiber has a core diameter  $80\mu\text{m}$  and a relative index difference of 1.5%, of  $0.85\mu\text{m}$ . If the core refractive index is 1.48 Determine: 5
- (1) The normalised frequency of fiber.
  - (2) The number of guided modes in the fiber.
- (b) Differentiate between LASER and LED. 5
- (c) Name different fiber fabrication process. Explain any one fiber fabrication process in detail with neat diagram. 10
4. (a) Explain and compare PIN diode with Avalanche photo diode (APD) with the help of suitable electric field diagrams. 10
- (b) Describe the different types of pre amplifiers used in optical receivers. 10

TURN OVER

**Q.P. Code :**

**2**

5. (a) Describe the various methods of splicing individual fibers together. Also list the merits and demerits of each method. 10  
(b) Explain all aspects of link power budget and rise time budget. 10
6. (a) Draw and explain block diagram of optical receiver alongwith various noise sources with relevant equations. 10  
(b) Draw and explain double heterojunction LED. 10
7. Write short notes on any four: 20
- (a) Multiplexing of optical signals.
  - (b) OTDR.
  - (c) Modal noise.
  - (d) Linear and nonlinear scattering losses.
  - (e) Optical fiber connectors.