

17633

11819

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any THREE of the following :

12

- (a) Justify the need of fiber optic communication.
- (b) Draw and explain construction of fiber optic cable.
- (c) Define and derive expression for Numerical Aperture.
- (d) Define the terms w.r.t. optical fiber :
 - (i) Critical Angle
 - (ii) Acceptance Angle

(B) Attempt any ONE of the following :

6

- (a) Name the fabrication process of optical fiber. Describe any one with neat sketch.
- (b) Draw the construction of Avalanche photodiode & describe its working. List the merits & demerits of same diode.

- 2. Attempt any FOUR of the following : 16**
- (a) Draw and explain block dia. of fiber optic communication system.
 - (b) Describe mechanical properties of fiber optic cable.
 - (c) Compare single mode and multimode fiber. (4 points)
 - (d) Describe bending loss in fiber optic cable.
 - (e) Explain spontaneous and stimulated emission.
 - (f) Describe working of CO₂ LASER with diagram.
- 3. Attempt any FOUR of the following : 16**
- (a) Define basic laws of optics. (any 4)
 - (b) Compare Step Index and Graded Index fiber. (4 points)
 - (c) Draw PIN photodiode. State its advantages and disadvantages.
 - (d) Describe the working principle of LED with neat diagram.
 - (e) Compare LED and LASER. (4 points)
- 4. (A) Attempt any THREE of the following : 12**
- (a) State the performance characteristics of LASER. Explain any two of them.
 - (b) State advantages and disadvantages of LED (2 each).
 - (c) Describe working principle of YAG LASER with neat sketch.
 - (d) Define the terms w.r.t. optical detector :
 - (i) Responsivity
 - (ii) Dark Current
- (B) Attempt any ONE of the following : 6**
- (a) Draw and explain Optical Time Domed Reflectometer (OTDR).
 - (b) Give the necessity of optical network. List the terminologies used in optical networking. Describe any one of them.

5. Attempt any FOUR of the following :**16**

- (a) Draw and explain Optical Isolator.
- (b) State types of mechanical splicing of fiber. Describe any one with neat diagram.
- (c) Draw any four fiber optic connectors.
- (d) Draw and explain fiber optic couplers.
- (e) Describe optical analog communication system.
- (f) Describe Under sea Optical System.

6. Attempt any FOUR of the following :**16**

- (a) Describe the working principle of Circulator with diagram.
 - (b) Describe longitudinal and lateral misalignment.
 - (c) Describe the concept of Wavelength Division Multiplexing in optical fiber.
 - (d) Describe the working of hybrid multichannel analog and digital optical system.
 - (e) Draw and explain optical digital communication system.
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