11718

3 Hours / 100 Marks Seat No. | | | | | | | | |

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) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **20**

(a) Compare LED and Laser Diode.

(b) List out any four advantages of optical fiber communication over conventional electrical communication.

(c) Define the terms with respect to optical fiber.

(i) Dispersion.

(ii) Scattering of light.

(d) Explain absorption and scattering losses in fiber optics.

(e) Define any four basic laws of optics.

(f) Explain lateral and angular fiber misalignment.

(g) State any four properties of good optical connectors.

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

(a) Explain following losses in Optical Fiber.

(i) Absorption losses.

(ii) Bending losses.

(b) Sketch constructional diagram of LED and write its operating principle.

(c) Define the following with well labelled diagram.

(i) Numerical aperture.

(ii) Acceptance angle.

(d) Name the types of LASER (any eight).

(e) State any two advantages and disadvantages of wave division multiplexing Optical Fiber Communication (OFC) system.

(f) Draw block diagram of Optical Time Domain Reflectometer and explain its working.

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

(a) Describe the working principle of YAG laser with neat diagram.

(b) With block diagram explain the concept of under sea Optical Communication System.

(c) Draw construction of photo diode and explain its working as optical detector.

(d) Draw the simple block diagram of optical digital system and explain.

(e) Draw and explain optical circulator.

(f) Define the following terms :

(i) Reflection

(ii) Refraction

(iii) Scattering

(iv) Dispersion

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

(a) A optical fiber has a core refractive index of 1.50 and cladding refractive index of 1.47. Calculate critical angle at the core-cladding interface and numerical aperture (NA) for the fiber optic.

(b) Compare step index and graded index optical fibers.

(c) Compare between PIN photodiode and Avalanche photodiode.

(d) Draw and explain block diagram of fiber Optic Communication System.

(e) Write applications of
  (i) SONET
  (ii) WDM

(f) Explain chromatic losses in brief which occurs in fiber optics.

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

(a) Explain with figure mechanical splicing.

(b) Explain the concept of Synchronous Optical Networking (SONET) using its architecture diagram.

(c) With structure of semi conductor LASER diode explain its working.

(d) Draw and explain the construction of fiber optics cable.

(e) Sketch block diagram and state features of hybrid multichannel analog and digital optical system.

(f) With neat sketch explain working of He-Neon laser.

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

(a) Draw the construction of PIN photo diode and explain its working.

(b) Explain the concept of wavelength division multiplexing in optical fiber communication system.

(c) Draw frequency spectrum for communication and show the region for optical communication system.

(d) Draw the effect of spontaneous emission and stimulated emission. Give examples for each effect.

(e) Explain ST and SMA optical fiber connector.

(f) Define the following terms for optical fiber :

(i) Responsivity

(ii) Dark Current
