

17633

21718

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) Draw the basic block diagram of fiber optic communication system. State the function of each block.
- (b) Define the terms w.r.t. optical fiber.
 - (i) Reflection
 - (ii) Refraction
 - (iii) Dispersion
 - (iv) Scattering of light
- (c) Differentiate between step index fiber and graded index fiber.
- (d) Draw constructional diagram of LED and write its operating principle.
- (e) Explain any four fiber connectors.
- (f) Explain lateral and angular fiber misalignment.
- (g) Explain the concept of wavelength division multiplexing in optical fiber communication system.

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

- (a) State the advantages of optical fiber cable over copper cable.
- (b) Describe briefly bending loss in fiber optic cable.
- (c) State advantages and disadvantages of LED. (two each)
- (d) Name the fabrication processes of optical fiber. Describe any one with neat sketch.
- (e) What is fiber coupler ? State working principle of core interactive and surface interactive type fiber coupler.
- (f) Compare photo diode and PIN diode. (four points)

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

- (a) State various types of splicing of fiber. Describe any one of them with neat sketches.
- (b) Sketch block diagram of optical time domain reflectometer and list out its any four specifications.
- (c) A light ray is incident from medium-1 to medium-2. If the refractive indices of medium-1 and medium-2 are 1.5 and 1.36 respectively, then determine the angle of refraction for an angle of incidence of 30° .
- (d) Explain spontaneous emission and stimulated emission. Give examples for each effect.
- (e) Explain SONET/SDH optical networking with neat diagram.
- (f) Draw schematic of LASER diode and describe its working principle.

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

- (a) Give the importance of undersea optical system.
- (b) Describe working of PIN photodiode with constructional diagram.
- (c) 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.
- (d) Draw and explain block diagram of optical analog system.
- (e) Explain characteristics of avalanche photodiode.
- (f) What are the features of WDM ?

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

- (a) List out band designation used in fiber optic communication. Explain various standards for optical fiber communication.
- (b) Derive an expression for acceptance angle of a fiber.
- (c) Differentiate between analog and digital optical system.
- (d) Write short note on optical isolator and circulator.
- (e) Compare single mode and multi mode fiber.
- (f) Explain chromatic losses.

P.T.O.

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

16

- (a) Explain absorption and scattering losses in fiber.
 - (b) Compare between LED and LASER.
 - (c) State any four properties of good optical connectors.
 - (d) Name the types of LASER. (any eight)
 - (e) Define the terms w.r.t. optical detectors :
 - (1) Responsivity
 - (2) Dark Current
 - (f) With the help of block diagram, describe optical digital system.
-