

1128  
M.E. (Electronics and Communication Engineering)  
First Semester  
ECE-1102: Fiber-Optics Communication Systems

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

- a) Difference between Step Index fiber and Graded index fiber
- b) Derive the relation between Numerical Aperture and Refractive Index
- c) Define Material Dispersion
- d) Define Optical Multiplexers
- e) Define Noise Figure (5x2)

UNIT - I

- II. a) What is the need of Cladding in optical fiber? Distinguish between single mode and multimode fiber.
- b) What is the need of Fiber optic communication system? State its advantages. (6,4)
- III. a) What do you mean by attenuation? Describe scattering losses.
- b) What do you mean by Inter-modal and Intra-modal dispersion in optical fiber? Describe them. (5,5)
- IV. Explain the working principle of ILD and VCSEL. Also describe their characteristics. (10)

UNIT - II

- V. a) Photons of energy  $1.53 \times 10^{-19}$  J are incident on a photo diode which has responsivity of 0.65 A/W. If the optical power level is  $10 \mu\text{W}$ , find the current generated?
- b) What are the different error sources that affect the performance of optical receivers? Describe them. (5,5)

P.T.O.



(2)

- VI. Explain the CSRZ, DPSK and QAM modulation formats with suitable diagrams. (10)
- VII. Write short note on:-
- a) Erbium doped fiber amplifier
  - b) Optical CDMA
- (5,5)

x-x-x