

2023

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. Define the following:-

- a) Numerical Aperture
- b) Rise time bandwidth
- c) Difference between Step index fiber and Graded index fiber
- d) Optical signal to noise ratio
- e) Optical Multiplexers

(5x2)

**UNIT - I**

- II. a) Draw the block diagram of a fiber optics communication system and describe its building blocks.  
b) Distinguish between single mode and multimode fiber. (6,4)
- III. a) A 30 km long optical fiber has an attenuation of 0.8 dB/km at 1300 nm. Determine the optical output power  $P_{out}$  if 200  $\mu$ W of optical power is launched into the fiber.  
b) Describe scattering losses. (5,5)
- IV. a) Explain the working of ILD.  
b) State the desirable characteristic of LASER and LED as optical sources. (6,4)

**UNIT - II**

- V. a) What is the difference between photovoltaic and photoconductive modes of operation of a photodiode?

Contd.....P/2

(2)

b) A photodiode is constructed of GaAs, which has a band gap energy of 1.43eV at 300K. Determine its long-wavelength cutoff. (5,5)

VI. Draw the schematic setup of a simple erbium-doped fiber amplifier and describe its working. Also state its applications. (10)

VII. Explain the following modulation formats:-

(a) NRZ

(b) DPSK

(5,5)

x-x-x