



CBGS SCHEME

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15EC82

Eighth Semester B.E. Degree Examination, Jan./Feb. 2023

Fiber Optics and Networks

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain Optical Fiber Communication System, with suitable block diagram. (08 Marks)
b. Describe what is implied by the term Photonic Crystal fiber and explain Index guiding Photonic Crystal fiber with a suitable diagram. (08 Marks)

OR

- 2 a. Explain briefly about Fiber Materials used in Optical communication. (06 Marks)
b. What are the advantages of Optical Fiber Communication? (04 Marks)
c. A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and a cladding refractive index of 1.47. Determine i) The critical angle at the core cladding interface ii) The NA for the fiber iii) The acceptance angle in air for the fiber. (06 Marks)

Module-2

- 3 a. Explain Linear and Non Linear Scattering losses in Optical fibers. (08 Marks)
b. What are the different types of Splicing and explain the techniques for tube splicing of Optical fibers. (08 Marks)

OR

- 4 a. With a neat diagram, explain different types of Bending losses in fiber. (06 Marks)
b. Explain the different types of Mechanical Misalignment between two fibers. (05 Marks)
c. What are the principal requirement of a Good Connector design. (05 Marks)

Module-3

- 5 a. Explain Electron Recombination and Associated Photon Emission for Direct and Indirect band gap material. (06 Marks)
b. Explain Reach – through avalanche photodiode, with a neat diagram. (05 Marks)
c. Explain the Three key transition process involved in laser action. (05 Marks)

OR

- 6 a. With the help of a neat diagram, explain High – Radiance Surface Emitting LED. (06 Marks)
b. With schematic, explain Reverse biased pin photodiode. (05 Marks)
c. With a neat diagram, briefly discuss the possible sources of noise in optical fiber receiver. (05 Marks)

Module-4

- 7 a. Explain the Operational principles and implementation of WDM Network with diagram. (08 Marks)
b. Explain the Amplification mechanism in EDFA amplifier, with the help of energy level diagram. (08 Marks)

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OR

- 8 a. Describe the principles of working of Isolators and Circulators with a neat diagram. (08 Marks)
- b. With a neat diagram, explain the principle of operation of Optical Add / Drop Multiplexers in an Optical network. (04 Marks)
- c. Briefly explain the basic operation of a Generic optical amplifier, with a neat diagram. (04 Marks)

Module-5

- 9 a. Explain Optical Fiber Network Evolution, with a neat diagram. (06 Marks)
- b. Explain an Optical packet switched network packet format, with a neat diagram. (05 Marks)
- c. Briefly explain Wavelength routing and the selection of a path in a WDM Network. (05 Marks)

OR

- 10 a. Explain the different types of Optical Networking Node Elements with a suitable diagram. (08 Marks)
- b. Explain the concept of Optical Burst Switching Networks. (08 Marks)
