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06EC72

**Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019**

**Optical Fiber Communication**

Time: 3 hrs.

Max. Marks:100

**Note:** Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART – A**

- 1
  - a. What are the advantages of optical fiber communication? (06 Marks)
  - b. Explain the structure of single mode and multimode step index and graded-index optical fibers with cross section and ray path. (07 Marks)
  - c. What are the different fiber materials used in optical communication? Explain briefly. (07 Marks)
  
- 2
  - a. Explain the different types of bending losses in optical fiber. (08 Marks)
  - b. Explain the material dispersion in optical waveguides. (06 Marks)
  - c. Explain the following parameters on optical fiber : (06 Marks)
    - i) Absorption
    - ii) Scattering loss.
  
- 3
  - a. With schematic of an edge – emitting double heterojunction LED, explain the operation. (06 Marks)
  - b. Give comparison between LED and laser diode considering the different parameters. (06 Marks)
  - c. A given APD has a quantum efficiency of 65% at wavelength of 900nm. If 0.5 microwatt of optical power produces a multiplied photocurrent of 10 micro Amps, find the multiplication factor M. (08 Marks)
  
- 4
  - a. Explain the different types of fiber splicing techniques, with neat diagrams. (06 Marks)
  - b. With the principal requirements of a good connector design, explain basic coupling mechanism used in Butt – Joint and expanded – beam connectors. (10 Marks)
  - c. A GaAs optical source with refractive index of 3.6 is coupled to a silica fiber that has a R.I. of 1.48. If the fiber end and the source are in close physical contact, find out the Fresnel reflection (R) and power loss in dB. (04 Marks)

**PART – B**

- 5
  - a. With a neat diagram, explain the working of optical receiver. (08 Marks)
  - b. Discuss briefly, how the eye diagram is powerful measurement tool for assessing the data-handling ability in a digital transmission system. (08 Marks)
  - c. Differentiate between Heterodyne and Homodyne coherent detection schemes, with respect to probability of error function of a BER. (04 Marks)
  
- 6
  - a. Explain the operation of multi-channel amplitude modulation standard technique for frequency division multiplexing of N independent information bearing signals. (07 Marks)
  - b. Explain the radio-over-fiber links with a concept of a broadband wireless access network for interconnecting antenna base stations with the central controlling office. (06 Marks)
  - c. Explain the link power budget, with a relevant diagram. (07 Marks)

- 7 a. Explain the wavelength division multiplexing network containing various types of optical amplifiers. (07 Marks)
- b. Explain the optical Isolator with a design and operation of a polarization independent isolator mode of three miniature optical components. (06 Marks)
- c. Explain the operation of optical Add/Drop multiplexers, with a relevant diagram. (07 Marks)
- 8 a. Explain the configuration of SONET/SDH rings, with relevant diagrams. (10 Marks)
- b. Write notes on the following :
- i) Optical amplifier ii) High speed light wave links. (10 Marks)

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