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Seventh Semester B.E. Degree Examination, June/July 2014

Optical Fiber Communication

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. List the advantages, disadvantages and applications of optical fiber communication system. (08 Marks)
- b. A step index multimode fiber with a NA of 0.2 supports approximately 1000 modes at an 850 nm wavelength. What is the diameter of its core? How many modes does the fiber support at 1320 nm and at 1550 nm? (09 Marks)
- c. Define acceptance angle and critical angle. (03 Marks)
- 2 a. Explain macro bending and micro bending losses with a neat diagram. (10 Marks)
- b. Explain the signal distortion in fibers. (06 Marks)
- c. Write a note on: i) Attenuation, ii) Absorption. (04 Marks)
- 3 a. List the desirable characteristics of the LED and LASER diode as optical sources. (08 Marks)
- b. Explain p-i-n photodiode with a neat diagram. (08 Marks)
- c. Photons of energy 1.53×10^{-19} J are incident on a photodiode which has responsivity of 0.65 A/W. If the optical power level is $10 \mu\text{W}$, find the photo current generated. (04 Marks)
- 4 a. What is splicing? Explain the fusion splicing with a neat diagram. (08 Marks)
- b. List the requirements of a good connector. (06 Marks)
- c. Explain the fundamental types of misalignments between fibres. (06 Marks)

PART – B

- 5 a. With a neat block diagram explain the digital signal transmission through an optical data link. (12 Marks)
- b. Give the classification of front end amplifier used in optical fiber communication system. Explain any one of them. (08 Marks)
- 6 a. Explain the optical power loss model with a neat diagram. (10 Marks)
- b. Clearly explain the analog link with the major noise contributions at each stage. (10 Marks)
- 7 a. What is WDM? Briefly explain the advantages of WDM. (04 Marks)
- b. Explain the polarization independent isolator with a neat diagram. (08 Marks)
- c. Write a note on MEMS technology. (08 Marks)
- 8 a. What are salient features of semiconductor optical amplifiers? (06 Marks)
- b. Write notes on:
 - i) SONET/SDH rings
 - ii) High speed light waveguide (14 Marks)

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