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Question Paper Code : 91420

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Seventh Semester

Electronics and Communication Engineering

EC 2402/EC 72/10144 EC 702 — OPTICAL COMMUNICATION AND NETWORKING

(Regulation 2008/2010)

(Common to PTEC 2402 – Optical Communication and Networking for B.E. (Part-Time) Sixth Semester – Electronics and Communication Engineering (Regulation 2009))

Time : Three hours

Maximum : 100 marks

Missing data may be suitably assumed.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define acceptance angle and NA of a fiber.
2. List any two advantages of single mode fibers.
3. What are the types of fiber losses which are given per unit distance?
4. List the factors that cause intrinsic joint losses in a fiber.
5. Define internal quantum efficiency of a LED.
6. What are the drawbacks of avalanche photo diode?
7. Mention the advantages of using transimpedance front and receiver configuration.
8. State the significance of maintaining the fiber outer diameter constant.
9. State the concept of WDM.
10. What is a soliton?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Define the normalized frequency for an optical fiber and explain its use. (8)
- (ii) Discuss on the transmission of light through graded index fiber. (8)
- Or
- (b) (i) Explain the features of multimode and single mode step index fiber and compose them. (8)
- (ii) A single mode step index fiber has a core diameter of $7\mu\text{m}$ and a core refractive index of 1.49. Estimate the shortest wavelength of light which allows single mode operation when the relative refractive index difference for the fiber is 1%. (8)
12. (a) (i) What is meant by critical bending radius of optical fibers? Explain. (8)
- (ii) Explain the following in single mode fiber : Modal birefringence and beat length. (8)
- Or
- (b) (i) Describe the three types of fiber misalignment that contribute to insertion loss at an optical fiber joint. (8)
- (ii) Outline the major categories of multiport fiber optic coupler. (8)
13. (a) (i) Describe the operation of a injection laser. (10)
- (ii) Compare the optical sources LED and ILD. (6)
- Or
- (b) (i) What are the possible noise sources that contribute the photo detector noise? (8)
- (ii) What is meant by detector response time? Explain. (8)
14. (a) Draw the block diagram of fundamental optical receiver. Explain each block. (16)
- Or
- (b) With diagrams explain the following :
- (i) Measurement of NA of a fiber (8)
- (ii) Measurement of refractive index profile. (8)
15. (a) Draw the block diagram of OTDR. Explain the measurement of any two fiber optic measurement with this. (16)
- Or
- (b) Discuss the following :
- (i) WDM networks
- (ii) Ultra high capacity networks. (8+8)