Reg. No. : | | | | | | | | | | |

Question Paper Code: 37402

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Seventh Semester

Electronics and Communication Engineering

01UEC702 - OPTICAL COMMUNICATION AND NETWORKS

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. What is the maximum core diameter for a fiber if it is to operate at single mode at a wavelength of 1550nm if the N.A is 0.12?
2. Why do we prefer step index single mode fiber for long distance communication?
3. What do you mean by polarization dispersion in a fiber?
4. Draw the schematic representation of expanded beam connectors.
5. What is meant by hetero junction structure?
6. Define responsivity of a photodiode.
7. Define quantum limit.
8. State the significance of maintaining the fiber outer diameter constant.
9. What is solitons?
10. What is optical CDMA?

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Explain acceptance angle and Numerical Aperture of fibers. (8)

(ii) A graded index fiber with a parabolic refractive index profile core has a refractive index at the core axis of 1.5 and a refractive index difference of 1%. Calculate the maximum possible core diameter which allows single mode operation at a wavelength of 1.3μ. (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 *micro meter* 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) Explain the causes and types of fiber attenuation loss with necessary diagrams. (16)

Or

(b) Explain various types of fiber splicing techniques and fiber connectors. (16)

13. (a) What are the possible noise sources that contribute the photo detector noise. (16)

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 the same in detail. (8)

14. (a) Explain the fundamental receiver operation in optical communication link. (16)

Or

(b) Explain any two methods used for measurement of refractive index profile of the fiber. (16)

15. (a) Explain in detail SONET layers and frame structure with diagram. (16)

Or

(b) Discuss the following:

(i) WDM networks (8)

(ii) Ultra high capacity networks (8)