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Question Paper Code: 37402

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

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. A silica 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 critical angle at the core-cladding interface and Numerical Aperture.
2. What is the total internal reflection in the fiber?
3. What do you mean by polarization dispersion in a fiber?
4. Draw the schematic representation of expanded beam connectors.
5. Draw the three key transition processes involved in laser action.
6. What is avalanche effect?
7. Define quantum limit.
8. State the significance of maintaining the fiber outer diameter constant.
9. What is optical CDMA?
10. Illustrate inter-channel cross talk that occurs in a WDM system.

PART - B (5 x 16 = 80 Marks)

11. (a) Explain with neat diagram the elements of an optical fiber transmission link. (16)

Or

(b) With diagram, explain acceptance angle and numerical aperture of fibers. (16)

12. (a) Discuss in detail about material and waveguide dispersion. (16)

Or

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

13. (a) (i) Describe the operation of a injection laser. (8)

(ii) Compare the optical sources LED and ILD. (8)

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) (i) What is broadcast-and-select multi hop network? Explain. (8)

(ii) Write a detailed note on optical CDMA and its applications. (8)