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

Question Paper Code: 31472

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

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 are the three different mechanisms which cause absorption?
4. Draw the schematic representation of expanded beam connectors.
5. Draw the three key transition processes involved in laser action.
6. Define responsivity of a photodiode.
7. Define quantum limit.
8. State the significance of maintaining the fiber outer diameter constant.
9. What are the pumping mechanisms used in erbium doped fiber amplifiers?
10. Illustrate inter-channel cross talk that occurs in a WDM system.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Explain with neat diagram the elements of an optical fiber transmission link. (10)

(ii) List the advantages of optical communication. (6)

Or

(b) (i) A multimode step index fiber with a core diameter of 80μm and a relative index difference of 1.5% is operating at the wavelength of 850nm. If the core refractive index is 1.48, estimate the normalized frequency for the fiber and the number of guided modes. (10)

(ii) Define total internal reflection, acceptance angle and numerical aperture. (6)

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) Draw and explain the construction and working of surface and edge emitting LED. (10)

(ii) State and derive the internal quantum efficiency of a LED. (6)

Or

(b) Explain in detail about construction and working principle of PIN Photodiode. (16)

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

Or

(b) Explain the measurement technique used in the case of fiber attenuation. (16)

15. (a) Explain the layered architecture of SONET/SDH with neat 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)

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