

9. Obtain the transmission bit rate of the basic SONET frame in Mbps.
10. Illustrate interchannel cross talk that occurs in a WDM system.

PART B — (5 × 16 = 80 marks)

11. (a) (i) With the help of a block diagram explain the different components of a optical fiber link. (12)
- (ii) Compare the optical fiber link with a satellite link. (4)

Or

- (b) (i) Explain the differences between meridional and skew rays. (4)
- (ii) Bring out the differences between phase and Group velocities. (6)
- (iii) Deduce an expression for NA of a fiber with the help of a neat figure showing all the details. (6)

12. (a) (i) Discuss the attenuation encountered in optical fiber communication due to :

- (1) Bending
- (2) Scattering
- (3) Absorption. (12)

- (ii) Calculate the maximum transmission distance for a fiber link with an attenuation of 0.2 dB/Km if the power launched is 1mW and the receiver sensitivity is 50 μ W. Calculate the attenuation for an other link with same parameters and the distance of 26 Kms. (4)

Or

- (b) (i) Clearly bringout the differences between intra and inter modal dispersion. (12)

- (ii) Find the maximum bit rate for the fiber link of 5 Kms. The numerical aperture is 0.25 and the refractive index is 1.48. (4)

13. (a) (i) Explain the working of n hetero structure LED. (10)
- (ii) Define Internal quantum efficiency of a LED. Deduce the expression for the same. (6)

Or

- (b) (i) What do you understand by optical-wave-confinement and current confinement in LASER diode? Explain with suitable structures. (10)

- (ii) Briefly explain the different noise sources of a photo detector. (6)

14. (a) (i) Explain any two types of preamplifiers used in a receiver. (12)
(ii) Define the terms – 'Quantum limit' and 'Probability of Error' with respect to a receiver with typical values. (4)

Or

- (b) (i) Explain the 'Insertion-Loss method' used for attenuation measurement. (8)
(ii) Explain the technique used in 'Frequency – Domain Intermodal Dispersion measurement'. (8)
15. (a) (i) What is a 'four-fiber BLSR' ring in a SONET? Explain the reconfiguration of the same during node or fiber failure. (8)
(ii) What is 'broadcast-and-select multihop network'? Explain. (8)

Or

- (b) (i) Explain the following requirements for the design of an optically amplified WDM link :
(1) Link Band width
(2) Optical power requirements for a specific BER. (8)
- (ii) Write a note on solitons. (8)