

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the Mode theory for circular waveguides. (8)
(ii) Describe the structure of graded index fiber with necessary diagrams. (8)

Or

- (b) (i) Explain the features and fabrication of various fiber materials. (8)
(ii) Discuss the fiber losses and the Non-Linear Optical effects. (8)
12. (a) (i) Explain the operation of EDFA with a neat diagram. (8)
(ii) Explain the design principles of PIN and avalanche photo diode. (8)

Or

- (b) (i) Explain fiber optic transmitter design principles with a neat diagram. (8)
(ii) Explain the operation of semiconductor optical amplifiers. (8)
13. (a) (i) Dry fibers have acceptable losses over a spectral region from 1.3 to 1.6 μ m. Estimate the capacity of WDM system covering this entire region using 40-Gb/s channels spaced apart by 50 GHz. (8)
(ii) Explain the vital role played by the tunable optical filter in WDM systems design. (8)

Or

- (b) (i) What is sub-carrier multiplexing? Derive the expression for the CNR of analog SCM light wave systems by including thermal noise, shot noise and intensity noise. (10)
(ii) Discuss the sensitivity of synchronous receivers using their BER. (6)
14. (a) Explain in mechanisms of pre and post compensation techniques for fiber dispersion. (16)

Or

- (b) (i) Explain the role of filter based grating techniques. (8)
(ii) Describe about soliton based communication system design. (8)
15. (a) (i) Explain the frame structures of SDH/SONET. (10)
(ii) Discuss the advantages of SDH/SONET over other schemes. (6)

Or

- (b) (i) Explain the concepts and operation of wave length routing networks. (10)
(ii) Discuss the merits and demerits of wave length routing networks. (6)