Time: 3 Hours **Max Marks: 80**

N.B : 1. Question number 1 is compulsory
2. Solve any Three questions from the remaining Five questions.
3. Draw neat sketches wherever required.

Q1 Solve any Four

1 a) Explain why presence of cladding is not essential for signal transmission. Then what are the benefits of providing cladding? (5)
b) Compare Optical Isolator with Coupler**.** (5)
c) Differentiate between LED and LASER light sources. (5)
d) Explain the concept of Fiber Bragg Grating. Give its applications (5)
e) Briefly explain about the optical access network. (5)

Q2 a) Derive an expression for Link Power Budget analysis of an optical fiber. (8)
Q2 b) Explain OTDR working principle in detail. Mention its applications. (7)
Q2 c) Explain briefly about fiber optic color code and its significance. (5)

Q3 a) What is an optical amplifier. Compare different types of optical amplifiers. (10)
Q3 b) Explain classification of Optical fibers based on the number of modes guided and refractive index profile. Elaborate core & cladding dimensions with the help of diagrams.(10)

Q4 a) Explain in detail structure of SONET/SDH network. (10)

Q4 b) If a multimode step index fiber having the core refractive index of 1.5, cladding refractive index of 1.38, core radius of 25 µm operates at a wavelength of 1300 nm. Calculate – (10)
(i) Numerical Aperture.
(ii) Normalized frequency
(iii) Solid acceptance angle.
(iv) Total no. of modes entering the fiber.

Q5.a) Explain in detail working principle and characteristics of APD and compare its working with PIN diode? (10)
Q5 b) List down the methods of fiber fabrication. Explain modified chemical vapour deposition (MCVD) method in detail with a neat diagram**.** (10)

Q6 Write short notes on **(Any TWO)**:- (20)

i) OTDM
ii) WDM network and architecture
iii) Passive optical network
iv) Optical safety
