3 Hours. **Marks : 80.**

N.B.

1) **Question No-1 is Compulsory.**
2) **Attempt any Three (03) Questions from remaining Five (05) Questions.**
3) **Assume suitable data where ever necessary.**

Q.1 **Attempt the following Questions(any4)**

a)	Define Snell's law and NA, state the use of NA ?	**5**
b)	Compare step Index Fiber and graded index fiber?	**5**
c)	General block Diagram of Optical communication with typical system of EDFA	**5**
d)	Give Transmission characteristics of optical fiber -Attenuation and effect of attenuation	**5**
e)	Draw Generic configuration of typical SONET or SDH Network,& layering model for IP	**5**
f)	Give the use of Generic optical Amplifier and draw the Optically Amplified Systems using EDFA	**5**

Q.2(a) Explain the basic principle of operation of photo detector Explain the working of PIN Diode List all the parameters that contribute to photo current gain of APD **8**

Q.2(b) Describe the types of fiber ,for each type give typical core and cladding diameters sketch the refractive index profile **6**

Q.2(c) Explain the Modified Chemical Vapour Deposition (MCVD) method of fiber fabrication? **6**

Q.3(a) Explain the different types of losses in optical fiber communication ,Give the various factors responsible for optical signal attenuation &Dispersion **8**

Q.3(b) Derive the expression for NA ,acceptance angle cone and solid angle for step Index fiber **6**

Q.3(c) State the difference between couplers and connectors, **Given:** Input Power = 1mWLength =1.3km Attenuation Coefficient, α = 0.6dB/km **Find:** Output Power **6**

Q.4(a) Compare LED sources S Type-E Type ,Define the quantum efficiency and responsivity of photo detector, A light source generating an optical power output equal to $1^{1\mu w}$ is coupled into an optical fiber with a cross sectional area larger than the active area of the light source. Determine the power coupled into the fiber. θ^0 equal to 15° **8**

Q.4(b) Explain with block schematic of optical fiber soliton transmission system with optical soliton pulses (i)collision of two solitons (ii)Four stable solitons at safe separation distance. **6**

Q.4(c) Explain Network Topologies used in SONET/SDH. Give the details of basic connection used with respect to Bus, Ring, Star Topologies. **6**

Q.5(a) Describe the structure and operation of OTDR ,Explain the method of Dispersion measurement using OTDR **8**

Q.5(b) Explain the term protocol and Internet protocol(IP),using OSI reference model discuss implementation aspect of the (i)SONET(ii)DWDM **6**

Q.5(c) Explain the Basic PON Architecture? write note on IP over DWDM **6**

Q.6 Write short note on **(any4)**: **20**

(a) Optical fiber connectors,& splicer
(b) largest –Distance power Budget
(c)Optical safety &Service Interface
(d)Optical Switches &Optical Burst Switching
(e)OADM Add/Drop Multiplexing & Typical WDM Link.
