BE | ETRX | CBGS | VII | OFC | 21/12/16

Sub: Elective I: Optical Fiber Communication

Q.P. Code : 729001

(3 hours) **Marks : 80**

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

1. Attempt the following Questions (any 4)
   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**

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**

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

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

3. a) Explain the different types of losses in optical fiber communication ,Give the various factors responsible for optical signal attenuation & Dispersion **6**

3. b) Derive the expression for NA .acceptance angle cone and solid angle for step Index fiber

3. c) State the difference between couplers and connectors, Given: Input Power= lmWLength = 1.3km Attenuation Coefficient, a= 0.6dB/km Find: Output Power **8**

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 1μw is coupled into an optical fiber with a cross sectional area larger than the active area of the light source. **6**
Determine the power coupled into the fiber. θ'' equal to 15° **6**

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.

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

[TURN OVER]

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

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

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

6. Write short note on (**any 4**): **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.
