Paper Id: | 131283 | **Roll No.** ☐☐☐☐☐☐☐☐☐☐☐

B.TECH.
(SEM VIII) THEORY EXAMINATION 2018-19
OPTICAL NETWORKS

Time: 3 Hours   *Total Marks: 100*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   **Attempt *all* questions in brief.**   **2 x 10 = 20**

   a. Define Effective length of Fiber.

   b. A step index multimode glass fiber has a core diameter of 65 μm and cladding refractive index of 1.45. Find the acceptance angle of fiber, if it has to maintain limiting intermodal dispersion value of 10 ns/km.

   c. Define Extinction ratio.

   d. Explain how wave-length convertor can be realized with Four Wave Mixing phenomenon.

   e. Differentiate between connection-less and connection-oriented services with suitable examples.

   f. Compare different Optical Add-Drop Multiplexer architecture.

   g. Compare revertive and nonrevertive protection scheme.

   h. How the wavelength conversion reduces the blocking probability in the optical network?

   i. How tunable delay is used to achieve synchronization in the optical networks?

   j. What is IP over WDM?

SECTION B

2.   **Attempt any *three* of the following:**   **10 x 3 = 30**

   a. Elaborate the advantages of Wave-length Division Multiplexing over Optical Time Division Multiplexing.

   b. Describe different parameters used to characterize the suitability of a switch for optical networking applications.

   c. Discuss various issues faced by PDH(plesiochronous digital hierarchy) technology and how the SONET/SDH transmission technology solve these issues, how do we fix 51.84 Mbps as the basic transmission rate of SONET/SDH.

   d. Compare different optical protection schemes.

   e. Elaborate the working Fiber to the Curb(FTTC), Why ring architecture is preferred in optical networks over other architecture.

SECTION C

3.   **Attempt any *one* part of the following:**   **10 x 1 = 10**

   a. Explain different linear and non linear losses occur in optical fiber.

   b. Explain, how Stimulated Raman Scattering can be used to extend the useable bandwidth of single mode optical fiber from C(1530 nm to 1565 nm) band to C+L(1530 nm to 1625 nm) band.

4. **Attempt any *one* part of the following:** **10 x 1 = 10**

  a. Explain, the working principle of Acousto-Optic Tunable filter, also elaborate its application as wavelength cross-connect.

  b. Elaborate the principle of operation of optical coupler.

5. **Attempt any *one* part of the following:** **10 x 1 = 10**

  a. What are optical cross connects, elaborate several key features provided by optical cross connects in optical networks?

  b. Illustrate ATM reference model, also explain, by using different values of Payload type and Cell Loss Priority bits of ATM cell header fields, how can we provide different type services?

6. **Attempt any *one* part of the following:** **10 x 1 = 10**

  a. Explain, with suitable example, how the cost of optical network can be optimized with the deployment of different optical network components.

  b. Compare the different protection schemes in SONET/SDH network deployment.

7. **Attempt any *one* part of the following:** **10 x 1 = 10**

  a. Explain different functions performed by IP router.

  b. Compare the bit interleaving and packet interleaving in optical time division multiplexing.