Printed Pages:02 **Sub Code: KEC073**

Paper Id: | 2 | 3 | 1 | 9 | 1 | 1 | **Roll No.** | | | | | | | | | | | | |

B.TECH.
(SEM VII) THEORY EXAMINATION 2022-23
OPTICAL NETWORK

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If you require any missing data, then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2x10 = 20

(a) Identify the full form of SDH.
(b) Identify the central frequency used in long haul fiber optic communication.
(c) Estimate the amount of time needed to process 70 bytes small Ethernet packet data at 10 Gb/s data rate.
(d) Identify the scattering matrix for 2×2 couplers.
(e) Define dedicated protection.
(f) Define optical line amplifier.
(g) Define the spectral efficiency.
(h) Identify two classes of statistical traffic models that can be used in solving the dimensioning problem of networks.
(i) Define burst switching.
(j) Name the type of optical fiber cable used in long haul communication.

SECTION B

2. Attempt any *three* of the following: 10x3 = 30

(a) Differentiate between linear and nonlinear scattering.
(b) Illustrate working principle of grating.
(c) Identify the header of ATM layer.
(d) Illustrate the difference between network survivability and network protection.
(e) Illustrate Optical Time Division Multiplexing.

SECTION C

3. Attempt any *one* part of the following: 10x1 = 10

(a) Identify the non linear effects observed in optical fiber.
(b) Derive the relation between wavelength separation and frequency separation.

4. Attempt any *one* part of the following: 10 x1 = 10

(a) Illustrate the working principle of bragg gratings.
(b) Illustrate the difference between inter-channel and intra-channel crosstalk.

5. Attempt any *one* part of the following: 10x1 = 10

(a) Illustrate serial, parallel, and band drop OADM architecture.

(b) Illustrate any five service provisions offered by optical cross connect.

6. Attempt any *one* part of the following: 10x1 = 10

(a) Discuss the cost tradeoff among ring, hub and mesh design of five node network with suitable assumptions.

(b) Consider three nodes A, B, and connected by fiber optic WDM links. Assume the traffic generated is in the form of IP packets from routers located at these nodes with all router interfaces operate at 10 Gbps, which is also the transmission capacity on each wavelength on the WDM links. Now suppose, based on estimates of the IP packet traffic, 50Gbps of capacity is required between all three pairs of routers: A-B, B-C, and A-C. Propose an efficient network design solution to problem.

7. Attempt any *one* part of the following: 10x1 = 10

(a) Illustrate 1+1, 1:1 and 1: N protection techniques for point-to-point links.

(b) Illustrate the handling of node failure in Bidirectional Line Switched Ring.