

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

x-x-x

1. A) Describe in short the functions of ONU in an access networks.
B) Describe the conversion of analog voice channels to digital E1 signal.
C) State wavelength continuity constraint.
D) Discuss any two unique features of Raman amplifier in comparison to EDFA and SOA.
E) Discuss the difference between *single and multi-hop* broad cast and select optical networks.

5 x 2 = 10

PART-A

2. A) Discuss the key features or characteristics of optical filter used in optical networks. Discuss in detail the working principle of any one of the technology/type of optical filter. (5)
B) Write a short note on WDM optical networks, with the aid of suitable diagrams. (5)
3. A) Discuss the working principle of any one type of OADM, with the aid of suitable diagrams. (5)
B) Discuss the different characteristics of single hop and multi-hop optical networks. (3)
C) What should be the features of a wavelength converter to be deployed in optical networks. (2)
4. A) A given silicon APD has quantum efficiency of 65% at a wavelength of 900nm. Suppose 0.5 μ W of optical power produces a photocurrent of 10 μ A. Find the multiplication factor 'M'. (5)
B) Discuss the evolution of optical networks in detail. Also discuss the benefits of optical networks. (5)

P.T.O.

(2)

PART-B

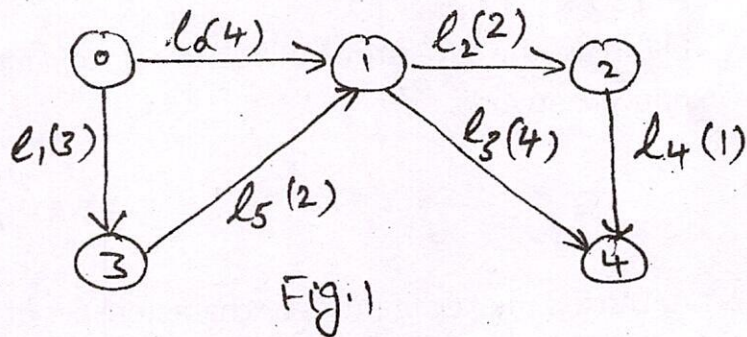
5. Consider a network with 5 nodes, 6 links and 4 wavelengths per link as shown in Fig. 1 given below. Assume that a new request arrives at node 0 for a connection to node 4. Let p denotes the node pair $\langle 0, 4 \rangle$. The cost factor is also given along the respective link. The set of links on each wavelengths is available is given as per the following table. Find all the suitable routing paths using exhaust routing along with their total cost or weight. Then do the wavelength assignment for all these routes using most used MU and LU algorithm. (10)

$W_0: l_0, l_1, l_2, l_3, l_4$

$W_1: l_0, l_1, l_2, l_3, l_5$

$W_2: l_1, l_2, l_3, l_4, l_5$

$W_3: l_0, l_1, l_2, l_3, l_4$



6. A) Discuss the working principle of a WDM PON. Explain also how is it different from other PON in terms of architecture and application. (6)
 B) Explain the different contention resolution schemes or methods in optical packet switched networks. (4)
7. A) Discuss in details different issues related to traffic grooming in SONET based metro optical networks. (5)
 B) Discuss the different signaling and routing protocols which are applied in optical burst switching. (5)