(Subject Code and Roll No. to be filled in your Answer Book)

Roll No. 1 2 0 4 6 3 1 5 0 3

M.Tech.

(SEM. II) 2012–13

OPTICAL NETWORKS

Time : 3 Hours *Total Marks : 100*

Note :- Attempt **all** questions. All questions carry equal marks.

1. Attempt any **four** parts of the following : **(5×4=20)**

   (a) Explain the reasons for growing demand of optical networks. What are the key network elements that enable optical networking ?

   (b) Differentiate between circuit switching and packet switching.

   (c) Explain the significance of optical layer in second generation optical networks.

   (d) Explain the limitations of optical fiber networks as factor responsible for loss in optical fiber.

   (e) Explain the structure and properties of DFB Laser.

   (f) What are the various new types of fibers that are used in present day for optical network communications ?

2. Attempt any **four** parts of the following : **(5×4=20)**

   (a) Write short note on application of non-linear effects of optical fiber.

(b) Explain the principle of operation of Isolator and Circulator.

(c) Discuss the advantages and disadvantages of the SONET/ SDH protocol.

(d) Write down and explain the link design equation in a point to point communication link, based on power budgeting.

(e) What is Kerr effect ? Explain self phase and cross phase modulation.

(f) What are solitons ? How they are capable of reducing the non-linear effects ?

3. Attempt any **four** parts of the following : **(5×4=20)**

(a) Explain why isolator is called passive non-reciprocal device. Explain its principle of operation.

(b) What are wavelength converters ? Mention the types and explain any one.

(c) What is cross talk ? Explain, how it can be reduced.

(d) Explain the working principle of MZI Multiplexer.

(e) Mention the advantages offered by optical amplifiers over regenerators. Explain principle of operation of EDFA.

(f) Explain, how Quality of Service (QoS) is implemented in ATM.

4. Attempt any **two** parts of the following : **(10×2=20)**

(a) Explain OTDM with a function of a bit interleaved optical multiplexer.

(b) Differentiate between Light Path Topology (LTD) problem and Routing and Wavelength Assignment problem (RWA). For a point to point WDM ring design topology, calculate design parameters required in determining and minimizing network cost.

(c) Why SONET/SDH are called self healing ? Explain the protection technique implemented in SONET/SDH ring.

5. Attempt any **two** parts of the following : **(10×2=20)**

(a) Explain the functions performed by Routers in Photonic Packet Switched (PPS) networks.

(b) Explain the optical switching on the basis of Optical Cross Connect and Optical Burst Switching.

(c) What are the different ways deployed for increasing transmission capacity in optical networks ? Explain architectural choices for deploying next generation transport networks.