

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. IIND Semester Examination – June/July- 2011

Subject code: 1722701

Subject Name: Optical Networks

Date: 22/06/2011

Time: 10:30 am – 01:00 pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain the following terminologies with respect to optical network: **05**
(i) Circuit switching (ii) Mesh topology (iii) wavelength reuse
(iv) Optical line amplifier (v) Ring topology .
- (b) Explain various losses in an optical fiber. **04**
- (c) Explain the various components of a unidirectional WDM link. Explain power penalty for various system impairments.. **05**
- Q.2** (a) What is the basic difference between reciprocal and non reciprocal devices? Explain the function of isolators and circulators. Explain principle of operation of an isolator with a neat diagram for polarization and polarization independent cases. **07**
- (b) What is a grating ? Give examples. Explain the principle of operation of Bragg Grating and discuss advantages and applications of fiber gratings. **07**
- OR**
- (b) Explain how Mach-Zehnder Interferometer can be used as multiplexer and a demultiplexer. Give its applications **07**
- Q.3** (a) What are the advantages of optical amplifiers over regenerators? Explain the principle of operation of Erbium doped Fiber Amplifiers with a neat sketch. **07**
- (b) What is a cross talk .Distinguish between interchannel and intrachannel crosstalk. Explain methods crosstalk suppression in networks. **07**
- OR**
- Q.3** (a) What do you mean by dispersion in an optical fiber? Discuss the different types of distortion? **07**
- (b) Explain the following with respect to SONET/SDH. Discuss its benefits and transmission rates. Discuss the structure of an STS-1 frame and STS-N frame **07**
- Q.4** (a) List the features of optical transport network **07**
- (b) Explain Internet Protocol, routing and forwarding of packets in network and Quality of service assurance to the users . **07**
- OR**
- Q.4** (a) Write a brief note on (Any Two): **07**
(i) Storage Area Network (ii) Optical Crossconnects
(iii) Chirped Fiber Bragg Grating (iv) Resilient Packet Ring.
- (b) Explain the following with respect to EDFA **07**
(i) Features (ii) Gain Saturation (iii) Gain Equalization

- Q.5 (a)** Explain the role of an Optical ADD/Drop Multiplexers in a three-node linear network. Discuss different OADM architectures. **07**
- (b)** What are the functions of network management in an optical network. Explain how network management functions are implemented in a typical optical network. **07**
- OR**
- Q.5 (a)** What is network survivability. Discuss different protection schemes used in a network. **07**
- (b)** Compare unidirectional path switched rings and bidirectional line switched rings. Explain with a neat schematic. **07**
