

GUJARAT TECHNOLOGICAL UNIVERSITY
M.E Sem-I Regular Examination January / February 2011
Subject code: 710405N

Subject Name: Fiber Optic Communication

Date: 03 /02 /2011

Time: 02.30 pm – 05.00 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)** Define (i) Kerr nonlinearity.(ii) Fiber Birefringence.(iii) Frequency Chirping **07**
(b) Explain in Brief (i) List nonlinear effect in optical fiber link **07**
(ii) Dispersion Shifted Fiber(iii) SRS (Simulated Raman Scattering)

- Q.2 (a)** Explain setup for a Raman Amplification System. **07**
(b) Explain Erbium Doped Fiber Amplifier with efficiency & gain equation. **07**

OR

- (b)** Consider an EDFA being pumped at 980nm with 30 mW pumped power. If the gain at 1550nm is 20db then calculate maximum input power. **07**

- Q.3 (a)** Derive rate equation for laser diode. **07**
(b) A digital optical fiber communication system operating at a wavelength of 1 μm requires a maximum bit error rate 10^{-9} . Determine minimum incident optical power at the detector in order to achieve the above bit error rate when system is employing ideal binary signaling at 10Mbits/s and assuming the detector is ideal. **07**

OR

- Q.3 (a)** Explain Reach- through APD with neat sketch and necessary equations. **07**
(b) Explain any three-power penalties in optical fiber. **07**

- Q.4 (a)** List Different Types of Electro Optic switches and Explain any one in detail. **07**
(b) What is meant by Optical Time Domain Reflectometer? Explain OTDR in detail with required diagram and sketch. **07**

OR

- Q.4 (a)** What is soliton? Explain soliton transmitter in detail. **07**
(b) What is DWDM ? Write a short note on WDM **07**

- Q.5 (a)** What is self phase modulation? Explain in detail what is its effect for propagating light wave through fiber cable. **07**
(b) Compared and contrast using suitable diagram the outside vapour –phase oxidation process & modified chemical vapor deposition (MCVD) technique for the preparation of low cost fiber. **07**

OR

- Q.5 (a)** Explain how the GVD limits the performance of optical communication system with suitable equation and graph **07**
(b) A double Hetrojunction InGaAsP LED emitting at a peak wavelength of 1310nm has radiative and nonradiative recombination times of 30and 100 ns respectively. The drive current is 40mA. Calculate internal quantum efficiency and optical power generate internally. **07**
