

Code No: D6103, D7003, D6503, D3803**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****M.TECH II - SEMESTER EXAMINATIONS, APRIL/MAY 2012****OPTICAL COMMUNICATIONS TECHNOLOGY****(COMMON TO COMMUNICATION SYSTEMS, ELECTRONICS & COMMUNICATION ENGINEERING, WIRELESS & MOBILE COMMUNICATIONS, DIGITAL ELECTRONICS & COMMUNICATION SYSTEMS)****Time: 3hours****Max. Marks: 60****Answer any five questions
All questions carry equal marks**

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- 1.a) Discuss the various parameters that effect the signal propagation in optical fibers with respect to wave theory approach.
- b) What are solitons? Explain the pulse propagation in solitons.
- 2.a) Why do second order non linearities typically not affect a light wave system?
- b) Give an account on stimulated Raman Scattering.
- 3.a) Show that the extinction ration penalty in amplified systems limited by signal spontaneous beat noise and spontaneous-spontaneous beat noise is
$$PP = -10 \log \left(\frac{r - 1\sqrt{r+1}}{r + 1\sqrt{r+1}} \right)$$
 assume that other noise terms are negligible and standard notations.
- b) Explain various cross talk reduction methods in optical switches.
- 4.a) Sketch the three port and four port circulators and discuss the principle of operation of Circulators and isolators?
- b) What is the use of Mach-Zehnder Interferometer (MZI)? Explain its principle of operation with neat diagram.
- 5.a) Give an account on Wavelength stabilization against temperature variations.
- b) Explain in detail Direct and Extend modulation Transmitters.
- 6.a) Discuss the Acoustic-Optic Tunable Filter(AOTF) as a Router and explain its principle of operation.
- b) Give an account on Erbium- Doped Fiber Amplifiers with neat Diagram.
- 7.a) What is modulation and demodulation? Discuss the signal forms and formats for modulation in receiver.
- b) Show that Bit Error Rate $BER = Q \left(\frac{\sqrt{GP}}{2\sqrt{(G-1)P_n B_e}} \right)$ and plot the receiver sensitivity as a function of bit rate for different receivers. Assume standard notations.
- 8.a) Discuss the Broadcast and select single HOP and multi HOP Networks.
- b) Explain Time Domain Intermodal Dispersion methods.
