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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)
08.702 : OPTICAL COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

Instructions : *Part – **A** : Answer **all** questions, **each** carries **4** marks.*
*Part – **B** : Answer **any two** questions from **each** Module.*

PART – A

Answer **all** questions :

1. Briefly explain dispersion shifted, dispersion flattened and dispersion compensated fibers.
2. Find the core radius for single mode operation at 1320 nm of a step index fiber with n1 = 1.48 and n2 = 1.478. What is the maximum acceptance angle of the fiber ?
3. Explain the lasing action in FP laser.
4. An optical signal at a specific wavelength has lost 55% of its power after traversing 3.5 Km of fiber. What is the attenuation in dB/Km of this fiber.
5. Explain different noise sources in optical receiver.
6. Explain the terms quantum efficiency and responsivity of a photo detector.
7. Differentiate homodyne and heterodyne coherent optical communication systems.
8. Show that there exists an optimum value for soliton pulse width for minimum BER.
9. List out the merits of soliton communication systems.
10. Explain challenges in DWDM. **(10×4=40 Marks)**

PART – B

Answer **any 2** from **each** module.

Module – I

11. Explain the vapour phase oxidation process of fiber fabrication with suitable figures.

12. A multimode fiber with a 50-micrometer core diameter is designed to limit the intermodal dispersion to 10 ns/km. What is the numerical aperture of this fiber ? What is the limiting bit rate for transmission over 10 km at 0.88 micro meter ? Let the refractive index of the cladding is 1.45. Also find the number of modes supported.

13. With suitable diagrams explain the operation of PIN diode and APD. **(10×2=20 Marks)**

Module – II

14. Explain the working principle of EDFA with suitable diagram and derive an expression for the gain of EDFA.

15. Make the power budget and calculate the maximum transmission distance for a 1300 nm light-wave system operating at 100 Mb/s and using an LED for launching 0.1 mW of average power into the fiber. Assume 1dB/Km fiber loss, 0.2 dB splice loss every 2 Km, 1 dB connector loss at each end of fiber link, and 100 nW receiver sensitivity. Allow 6dB system margin.

16. Explain the operation of OTDR with the help of block diagram. **(10×2=20 Marks)**

Module – III

17. Discuss the importance of ADM, AWG and wavelength tunable sources in WDM systems.

18. Explain briefly GH effect, soliton lasers.

19. Explain the use of lumped EDFA repeaters in soliton systems. Show that the energy of standard solitons should be increased by a factor Gln G/(G-1) to compensate the fiber loss α, where $G = \exp(\alpha L_A)$ is the amplifier gain and L_A is the spacing between amplifiers. **(10×2=20 Marks)**