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Reg. No. :

Name :

**Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)**

08.702 : OPTICAL COMMUNICATION (T)

Time : 3 Hours

Max. Marks : 100

PART – A



Answer **all** questions. **Each** question carries **4** marks.

1. Describe an optical fiber with diagram.
2. What do you mean by the numerical aperture ? Write an expression for it.
3. Explain with diagram a loose tube optical fiber cable.
4. A multimode stepindex fiber is provided with the following data; diameter of fiber = $52 \mu\text{m}$, numerical aperture = 0.25 and operating wavelength = $1.2 \mu\text{m}$. Determine total number of guided modes propagated and total number of guided modes if the same is multimode graded index fiber.
5. A optical system is provided with following (i) Bias current of optical source = 25 mA (ii) forward voltage = 1.6 V (iii) internal efficiency of the source = 3% and (iv) fiber acceptance angle = 25° . Determine the optical power coupled into the fiber.
6. What do you mean by modes of laser diode ? Explain.
7. A detector is provided with the following data (i) operating wavelength = 850 nm (ii) output current = $85 \mu\text{A}$ (iii) power of light beam = $850 \mu\text{W}$. Determine responsivity.
8. What are the performance criteria of WDM system ?
9. What do you mean by the term rise time budget of optical system ?
10. What techniques are used to fabricate couplers ? Explain. **(10×4=40 Marks)**

P.T.O.

**PART – B**

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. With neat sketch describe double crucible method for producing optical fiber.
12. With neat sketches explain LED characteristics and derive the expression for internal and external quantum efficiencies.
13. Describe the intermodal and intramodal dispersion in optical fiber with diagram.

Module – II

14. With neat sketches explain different receiver amplifier configuration.
15. With the help of neat sketch describe EDFA architecture.
16. Make a rise time budget for a $0.85 \mu\text{m}$, 10 Km fiber link designed to operate at 50 Mbps. The LED transmitter and the Si PIN receiver have rise time of 10 ns and 15 ns respectively. The graded index fiber has a core index of 1.46, $D = 0.01$ and $D = 80 \text{ ps/km-nm}$. The LED spectral width is 50 nm. Can the system be designed to operate with NRZ format ?

Module – III

17. What is WDM ? How is it implemented? Briefly explain WDM standards.
18. What is tunable optical filters ? Explain with structure. What major parameters are used to characterize tunable filters.
19. Explain five system design constraints of soliton light wave system. **(6×10=60 Marks)**