



Reg. No. :

Name :

**Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)**

08.702 OPTICAL COMMUNICATION (T)

Time : 3 Hours

Max. Marks : 100

PART – A



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

1. Define numerical aperture of a step index fiber and explain.
2. What is single mode fiber and multimode fiber ?
3. Photons of 1300 nm wavelength are incident on a photodiode at a rate of 5×10^{10} s and the electrons are collected at a rate of 2×10^{10} /s. Calculate the quantum efficiency and responsivity of the diode.
4. The refractive index of a material used for fabricating an LED is 3.5. Calculate its external quantum efficiency.
5. List the requirements of a photodetector.
6. Draw different receiver amplifier configurations.
7. Explain the convenient budget analysis for determining the dispersion limitations of an optical fiber link.
8. Explain the concept of WDM and hence explain key system features.
9. What is soliton ? Describe the soliton formation in brief.
10. Define MFD. How is it related to V number ?

(10×4=40 Marks)



PART – B

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

Module – I

11. The relative refractive index difference between of a fiber is 0.7% and its core refractive index is 1.45. Calculate the values of NA of the fiber when (a) index profile is not taken into consideration (b) index profile is triangular.
12. For a step index fiber $n_1 = 1.465$ and $n_2 = 1.46$, normalized frequency is 2.4. Calculate the core radius and numerical aperture at 800 nm.
13. Explain the principle of working of a semiconductor Laser using suitable diagram.

Module – II

14. Explain the point to point link design with reference to the choice of components and their associated characteristics.
15. Draw the equivalent circuit of optical receiver and explain the related terms.
16. For an EDFA to be used as a power amplifier, what should be minimum pump power required to obtain 12 dBm output at 1540 nm, if the amplifier input is 0 dBm and the pump wavelength is 980 nm.

Module – III

17. Briefly describe the communication applications of optical fiber gratings (FBG).
18. List and explain the functions of fiber-optic network management.
19. Explain the design steps of soliton based optical link. **(6×10=60 Marks)**