2007 ANNA UNIVERSITY
B.E/B.TECH DEGREE EXAMINATION
OPTICAL COMMUNICATIONS
(ELECTRONIC AND COMMUNICATION ENGINEERING)

TIME-3HOUR
MARKS-100

ANSWER ALL QUESTIONS

PART - A [10X2=20]

1. What is the fundamental parameter of a single mode fiber?

2. A step index fiber has a normalized frequency V = 26.6 at 1300 nm wavelength. If the core radius is 25 pm, find the numerical aperture.

3. Mention the two causes of intra-modal dispersion.

4. Define fiber loss.

5. Compare LED and LASER.

6. What is meant by population inversion?

7. A photo diode is constructed of GaAs, which has band gap energy of 1.43 eV at 300 K. What is meant by long wavelength cutoff?

8. What are the benefits of a trans-impedance amplifier?

9. List the key requirements needed in analyzing a link.

10. Define Modal Noise.

PART - B [5X16=80]

11. (a) What are fiber modes? Explain mode theory for optical fibers in detail.
Or
(b) Compare Single mode fibers and Graded index fibers. Explain the requirements for fiber materials.

12. (a) Discuss various kinds of losses that an optical signal might suffer while propagating through fiber, Which is most important one? What is the effect of these losses on light power and pulse shape?
Or
(b) What is mode coupling? Discuss pulse broadening in Gl fibers.

13. (a) With neat diagram explain the construction and working of high radiance surface emitting LED.
Or
(b) Discuss about modulation of Laser diodes. Why thermoelectric cooler are used in Laser diodes?

14. (a) What is known as quantum limit? A digital fiber optic link operating at 850 nm requires a maximum BER of 10*9. Find the minimum incidental optical power Po to achieve this BER at a data rate of 10 Mb/s for a simple binary level signaling scheme. (ry: 1), [1/r : B/2].
Or
(b) Discuss in detail digital receiver performance calculation and sensitivity calculation in detail.

15. (a) What are the system consideration in point to point links? Explain in detail.
Or
(b) Discuss in detail Fiber splicing and connectors. Explain the operation principles of WDM.