Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE) (2011 Batch)/(ETE) (2011 Onwards) (Sem.–7,8)

OPTICAL COMMUNICATION

Subject Code : BTEC-702

Paper ID : [A3001]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Q1. Write briefly :

a. Define numerical aperture.

b. Discuss briefly chromatic dispersion.

c. Give the importance of V number or normalized frequency of fiber.

d. What is meant by indirect band gap semiconductor material?

e. Define modulation bandwidth of an LED.

f. How do we achieve *'population inversion'*?

g. Explain briefly Responsivity.

h. What are the drawbacks of Avalanche photo diode?

i. Define frequency chirping.

j. Define Optical TDM systems.

SECTION-B

Q2. Discuss the following for optical fibers :

a. Absorption

b. Rayleigh Scattering

Q3. A single-mode fiber is measured to have $\lambda^2(d^2n = d\lambda^2) = 0.02$ at 0.8 μm. Calculate the dispersion parameters β_2 and D.

Q4. Explain the operation of DFB and DBR lasers.

Q5. a. Explain in brief need of fiber optic Communication and Evolution of Light Wave Systems.

b. A multimode fiber with a 50 μm core diameter is designed to limit the intermodal dispersion to 10 ns/km. What is the numerical aperture of this fiber?

Q6. Explain the concept of Dispersion in Single mode fibers.

SECTION-C

Q7. a. Explain the p-i-n diode and the concept of receiver noise for p-i-n receivers.

b. Photons at a rate of 10^{10} /s are incident on an APD with responsivity of 6 A/W. Calculate the quantum efficiency and the photocurrent at the operating wavelength of 1.5 μm for an APD gain of 10.

Q8. Explain the Loss limited Lightwave systems and Dispersion Limited lightwave systems.

Q9. a. Derive an expression for the CNR of analog SCM lightwave systems by including thermal noise, shot noise, and intensity noise.

b. Explain Time division multiplexing in brief.