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

Total No. of Questions : 09

B.Tech.(ECE)/(ETE) (2011 Batch) (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 has to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a) Numerical aperture is a measurement of ability of optical fiber, Justify.

b) A multimode graded index fiber exhibits a total pulse broadening of 1.2 ns over a distance of 30 Km. Determine the pulse dispersion per unit length.

c) Define beat length. A single mode fiber has beat length of 8 cm at 1300nm. Find modal birefringence.

d) Discuss the advantages of propagation through single mode fiber.

e) Bandwidth distance product helps to compare performance of different optical links, Justify.

f) Birefringence is very important aspect during optical transmission justify.

g) A fiber of length 10 km with mean optical launched power 150 μW and output received power 5 μW. Determine loss in dBs.

h) What are various categories of material absorption losses?

i) Discuss importance of using modulation format prior to transmission.

j) How bending loss effect performance of optical system?

SECTION-B

2. What do you mean by code division multiplexing? List the possible technologies used in optical communication CDMA.

3. Discuss the concept of p-i-n photodiode. What is significance of intrinsic layer inserted between the P and N layer?

4. Briefly describe various types of noise due to spontaneous fluctuations in optical communication system.

5. A step index fiber has core cladding refractive index of 1.50 and 1.46 respectively. What is the value of critical angle and numerical aperture of fiber?

6. What do you understand by modes in optical fibers? Compare single mode and multi mode fiber.

SECTION-C

7. A silicon APD (x=0.3) has capacitance of 5 pF, negligible dark current and is operating with a post detection bandwidth of 50 Mhz. When the photocurrent before gain is 10^{-7}A and temperature is 18 °C, Determine the maximum signal to noise ratio improvement between M = 1 and M = M_{OP} assuming all operating conditions are maintained.

8. Explain various guidelines of fiber optic communication system. What is link budget and bandwidth budget?

9. Explain the necessity of preamplifier in an optical receiver. Mention the types of preamplifier used and explain the working of any one of them.