M.Tech 2nd Semester (ECE) CBCS Scheme

Examination, May–2017

OPTICAL COMMUNICATION

Paper-MTECE 22 C2

Time allowed : 3 hours] *[Maximum marks : 100*

Note : ***Question no. 1 is compulsory.*** *Attempt any* ***five*** *questions by selecting at least* ***one*** *question from each section.*

1. (a) What are the advantages and disadvantages of optical fiber communication. 4

   (b) Define Numerical Aperture and absorption. 4

   (c) Write note on bandwidth noise in APD. 4

   (d) Define Equalization. 4

   (e) Write note on noise in coherent receiver. 4

Section-A

2. (a) Explain optical fiber dispersion. 10

   (b) Explain step index and graded index fiber. 10

3. (a) Explain Ray theory for optical propagation and why it is necessary to meet the total internal reflection requirement in an optical fiber ? 10

(b) Calculate the number of modes in a 50/125 graded index fiber having a parabolic index 2.0, reflective index of core = 1.485 and clad =1.46 at an operating wavelength of 820 nm and at 1300 nm. Also calculate number of modes in an equivalent step index fiber at both wavelengths.

Section-B

4. (a) What is the requirement for optical sources to feed into a fiber ? 10

(b) Explain working of PIN photodiode. 10

5. (a) Explain distributed feedback lasers in detail. 10

(b) What are the advantages and disadvantages of avalanche photodiode. 10

Section-C

6. (a) Explain AGC in detail. 10

(b) What are three basic performance criteria of wavelength division multiplexing ? 10

7. (a) Explain working of LED drive circuits. 10

(b) Explain TDM sub-carrier multiplexing. 10

Section-D

8. Prove that 3 db advantage of homodyne detection showing that the average electrical power generated by a coherent receiver is twice as large for homodyne detection as for hetrodyne detection under identical optical condition. 20

9. Explain synchronous and asynchronous demodulation in detail. 20