

M.E. First Year First Semester (Electronics & Tele.) (Full Time) (C.G.S. - New)
13331 : Advanced Optical Communication : 1 ENTC 1

P. Pages : 2
Time : Three Hours



AX - 3626
Max. Marks : 80

- Notes :
1. Answer **three** question from Section A and **three** question from Section B.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Diagrams and chemical equations should be given wherever necessary.
 5. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION – A

1. a) Explain the structure and performance characteristics of multimode step index fibers and multimode graded index fibers. 7
b) Summarise the various functions of the optical cable. 7

OR

2. a) What are different losses during transmission through attenuation by absorption and scattering. 7
b) What are the different criteria's considered for selection of fiber in designing of High speed / High Bandwidth optical communication systems. 7
3. a) Draw and explain the structure of double – heterojunction LED and its principle of operation. 7
b) Describe the principle, construction and working of non – semiconductor injection LASER (Nd : YAG Laser) 6

OR

4. a) What are the various types of optical sources? Discuss the drawbacks and advantages of LED over injection LASER. 7
b) What are the advantages of heterojunction over homojunction? Explain the heterojunction structure of LASER. 6
5. a) Explain the structure of Erbium – Doped Fiber Amplifier (EDFA) with its principle of operation. 7
b) Discuss in detail stimulated emission and spontaneous emission. 6

OR

6. a) Explain in detail the block schematic of an optical fiber soliton transmission system. 7
b) What is the need of an optical amplifiers? What are the advantages of an amplifier over regenerators? 6

SECTION - B

7. a) Explain the principle of operation of optical detector. What are the different types of optical detector? 7
- b) What is meant by detector sensitivity? How it is calculated? 7

OR

8. a) Explain the principle of operation of optical isolator. 7
- b) What are different characteristics of optical detector? 7
9. a) Write short notes on : 7
- i) angular dispersive devices
- ii) dielectric thin film filter type devices.
- b) Explain bit error rate. For what purpose it is calculated? 6

OR

10. a) Explain wideband DWDM network through any combination of ring or mesh network. 6
- b) Discuss various parameters for DWDM system design. 7
11. a) What are the various types of dispersion in optical fiber? Discuss the method of measurement of any one type of dispersion. 7
- b) The shadow method is used for the on-line measurement of the outer diameter of an optical fiber. The apparatus employs a rotating mirror with an angular velocity of 4 rad s^{-1} which is located 10 cm from the photodetector. At a particular instant in time a shadow pulse of width $300\text{ }\mu\text{s}$ is registered by the photodetector. Determine the outer diameter of the optical fiber in μm at this instant in time. 6

OR

12. a) What are the various techniques of attenuation measurement? Explain in detail insertion – loss method to measure attenuation of cables that have attached connectors. 7
- b) A graded index fiber with a parabolic refractive index at the core axis of 1.5 and a relative index difference of 1%. Estimate the maximum possible core diameter which allow single mode operation at wavelength of $1.3\text{ }\mu\text{m}$. 6
