

M.E. First Semester (Electronics & Telc.) (Full Time) (C.G.S.- New)

13331 : Advanced Optical Communication : 1 ENTC 1

P. Pages : 2

Time : Three Hours



AW - 3897

Max. Marks : 80

- Notes :
1. All question carry marks as indicated.
 2. Answer **three** question from Section A and **three** question from Section B.
 3. Due credit will be given to neatness and adequate dimensions.
 4. Assume suitable data wherever necessary.
 5. Illustrate your answer necessary with the help of neat sketches.

SECTION – A

1. a) Differentiate various types of fibers according to their profile parameters. 7
b) A single mode step index fiber has core & cladding R.I. 1.498 & 1.495 respectively. Determine the core diameter required for the fiber to permit its operation over the wavelength range 1.48 to 1.60 μm . Calculate the new fiber core diameter to enable single mode transmission at wavelength 1.30 μm . 7

OR

2. a) An optical fiber in air has N.A. of 0.4. Compare the acceptance angle for meridional rays with that of skew rays which change direction by 100° at each reflection. 7
b) What do you mean by acceptance angle? Derive an expression for NA. How it is related to relative refractive index difference? 7
3. a) Explain the principle, construction & working of non-semiconductor injection LASER (Nd + YAG Laser) 7
b) What are the advantages of heterojunction over homojunction? Explain the heterojunction structure of LASER. 6

OR

4. a) Draw and explain the structure of double – heterojunction LED and its principle of operation. 7
b) Explain the different techniques used to couple light source from LED into a fiber. 6
5. a) What is the gain saturation in optical amplifier? What is its importance? 7
b) Discuss the stimulation emission phenomena in an EDFA. 6

OR

6. a) In an optical communication system, what is the need of an optical amplifiers what are the advantages of an optical amplifiers over regenerators? 7
b) Explain the structure of Erbium-Doped fiber Amplifier (EDFA) with its principle of operation. 6

SECTION – B

7. a) Explain in detail various characteristics of optical detectors. 7
b) What do you understand by detector sensitivity? How it is calculated? 7

OR

8. a) What is the importance of quantum limit in the design process of optic fiber communication system? 7
b) Explain the use of tunable filters alongwith an example. 7
9. a) Explain in detail a wavelength Division Multiplexing system. 7
b) Discuss various parameters for DWDM system design. 6

OR

10. a) Explain wideband DWDM network through any combination of ring or mesh network. 7
b) Describe in detail the dielectric thin filter type devices. 6
11. a) What are the various causes of dispersion in optical fiber? Discuss in detail the test set-up and display output for measuring chromatic dispersion by the phase shift method. 7
b) Why numerical – aperture is an important parameter of an optical fiber? Explain any one method for the measurement of numerical aperture. 6

OR

12. a) Explain in detail any one method for fiber refractive index profile measurement. 7
b) A trigonometrical measurement is performed in order to determine the numerical aperture of a step index fibers. The screen is positioned 10.0 cm from the fiber end face. When illuminated from a wide angled visible source the measured output pattern size is 6.2 cm. Calculate the numerical aperture of the fiber. 6
