

Roll No.

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|

Total No. of Pages : 01

Total No. of Questions : 08

M.Tech. (ECE) (2018 Batch) (Sem.-1)
OPTICAL COMMUNICATION SYSTEM
Subject Code : MTEC-PE2Y-18-5
Paper ID : [75181]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWELVE marks.

- Q1. Explain what is meant by critical bending radius of an optical fiber. A multimode graded fiber has a refractive index at the core axis of 1.46 with a cladding refractive index of 1.45. The critical radius of curvature which allows large bending losses to occur is $84 \mu\text{m}$ when the fiber is transmitting light of a particular wavelength. Determine the wavelength of the transmitted light.
- Q2. Discuss briefly subcarrier multiplexing used in WDM light wave systems.
- Q3. Explain what is meant by a graded index optical fiber, giving an expression for the possible refractive index profile. Using simple ray theory concepts, discuss the transmission of light through the fiber. Indicate the major advantage of this type of fiber with regard to multimode propagation.
- Q4. Describe what is meant by the fusion splicing of optical fibers. Discuss the advantages and drawbacks of this jointing technique.
- Q5. Discuss with the aid of a suitable diagram the cut-back technique used for the measurement of the total attenuation in an optical fiber. Indicate the differences in the apparatus utilized for spectral loss and spot attenuation measurement.
- Q6. Outline the common LED structures for optical fiber communications, discussing their relative merits and drawbacks. In particular, compare surface- and edge-emitting devices. Comment on the distinction between multimode and single-mode devices.
- Q7. Draw the structure of an erbium doped fiber amplifier and explain the function of each component.
- Q8. Write short notes on following :
- a) Applications of OFDM.
 - b) Design of dispersion shifted fibers.
 - c) Fiber Bragg Grating.