

Roll No. ....

**OLE-24443**  
**B. Tech. 7th Sem. (ECE)**  
**Examination – April, 2021**

**OPTICAL COMMUNICATION**

**Paper : ECE-415-F**

*Time : Three hours ]*

*[ Maximum Marks : 100*

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*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

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**Note :** Attempt *five* questions in total. Question No. **1** is **compulsory**. Attempt *one* question from each unit. All questions carry equal marks.

- 1.** Write short notes on the following :  $4 \times 5 = 20$
- (a) Explain Numerical aperture.
  - (b) Explain Critical bending radius of fiber.
  - (c) What do you understand by splicing loss in fiber.
  - (d) Explain the term responsivity.
  - (e) Differences between Edge emitting and Surface emitting LEDs.

## UNIT – I

2. (a) Give out advantages and disadvantages of optical communication system. 10
- (b) An optical fiber has NA of 0.22 and cladding reflecting index of 1.59. Determine : 10
- (i) Acceptance angle for the fiber in water having refractive index of 1.35.
- (ii) Critical angle at the core cladding interface in air.
3. (a) Explain propagation of Skew rays in optical fiber cable. 10
- (b) Draw the diagram and explain Evanescent field and Goos-Haenchen shift. 10

## UNIT – II

4. (a) What do you understand by attenuation ? Explain losses due to linear Scattering in optical fiber cable in details. 10
- (b) Discuss Bend losses in optical fiber cable and derive the equation for critical radius of bending. 10
5. (a) Discuss Step Index and Graded Index fiber with the help of suitable diagram. 10
- (b) Discuss application of various types of connectors in details. Also draw the diagram of each. 10

### UNIT – III

6. Explain the basic principle of operation and construction of LED. Also derive the equation for various type of efficiencies and how coupling efficiency can be improved when LED is used as light source. 20
7. (a) Give out the characteristics of Laser when used as light source in optical communication system. 10
- (b) Explain the conditions for Lasing and how these are achieved. 10

### UNIT – IV

8. (a) Explain principles of APD when used as photo detector. Also give out its advantages and disadvantages. 10
- (b) What all factors should be kept in mind while selecting the semiconductor material for construction of photo detector ? Explain in details. 10
9. Explain the following about PIN photo diode when used as photo detector : 6, 7, 7
- (a) Structure.
- (b) Noise.
- (c) Frequency response.