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B. TECH.
(SEM VII) THEORY EXAMINATION 2021-22
OPTICAL COMMUNICATION

Time: 3 Hours**Total Marks: 70****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

- 1. Attempt all questions in brief. 2 x 7 = 14**
- a. Define Numerical aperture of a step index fiber.
 - b. Compare receiver selectivity and sensitivity
 - c. What is the need of Cladding?
 - d. What are the advantages and disadvantages of SM fiber and MM fiber?
 - e. Formulate the BER and Q factor in an optical communication
 - f. Differentiate the coherence of LED with a laser optical source.
 - g. Define Rayleigh Scattering and Mie Scattering.

SECTION B

- 2. Attempt any three of the following: 7 x 3 = 21**
- a. Draw a block diagram of fiber optic communication system and describe the function of each component
 - b. Analyze the importance of Numerical aperture, acceptance angle and normalised frequency in an optical fiber.
 - c. What do you understand by the term external quantum efficiency and internal quantum efficiency of a LED.
 - d. Explain the working principle of PIN photo detector in detail
 - e. Illustrate modes in an optical fiber; also give field pattern of modes having different order.

SECTION C

- 3. Attempt any one part of the following: 7 x 1 = 7**
- (a) Explain Snell's law. What is total internal reflection? Explain with suitable diagram.
 - (b) Discuss Eye pattern features in an optical communication, also comment on ISI using Eye diagram.
- 4. Attempt any one part of the following: 7 x 1 = 7**
- (a) What are the losses on signal attenuation mechanisms in a fiber? Explain in detail
 - (b) Explain material dispersion and waveguide dispersion in detail
- 5. Attempt any one part of the following: 7 x 1 = 7**
- (a) Explain the working principle of LED. How the quantum efficiency of a LED is defined? List out various parameters which are needed to be optimized for getting maximum output power from the LED.
 - (b) What types of materials are used for optical sources? What are the advantages of double Hetro structure? Compare surface emitting and edge emitting LED structures.
- 6. Attempt any one part of the following: 7 x 1 = 7**
- (a) Explain avalanche photo diode and also explain effect of temperature on avalanche gain.
 - (b) Analyze the Distributed feedback LASER.
- 7. Attempt any one part of the following: 7 x 1 = 7**
- (a) Discuss Power Penalty in an optical communication? Also Explain Different Types of Power Penalties.
 - (b) Draw and explain the operation of Optical receiver.