SUPAUL COLLEGE OF ENGINEERING, SUPAUL

Mid-Semester Exam, 2024

B.Tech ECE 7th Semester

Optical Fiber Communication

Time: 2 Hours

Full Marks: 20

Instructions:

1) There are Seven questions in this paper. Attempt any five.
2) Each question carries four marks.

1. State the different types of fibers based on Index profile and explain it in detail.

2. A step index fiber is made with a core refractive index 1.52 and diameter 29 μm and cladding refractive index 1.5189. If it is operated at wavelength 1.3 μm. Find the V number of the fiber and number of modes it will support. Also find the number of modes if the fiber is changed to Graded index fiber with α=2.

3. Find the core radius necessary for single mode operation at 850 nm in step index fiber with core refractive index 1.480 and cladding refractive index 1.47. What is the numerical aperture and maximum acceptance angle of this fiber?

4. Define the terms numerical aperture, critical angle, acceptance angle, and total internal reflection.

5. Discuss in brief the basic requirements and considerations in fiber fabrication.

6. Briefly explain the attenuation in optical fiber, also draw and discuss the attenuation vs wavelength graph for standard fiber.

7. A continuous 15 km long optical fiber link has a loss of 2.5 dB/km. What is the minimum optical power level that must be launched into the fiber to maintain as optical power level of 0.5 μW at the receiving end.