Name:.....
Roll No:.....

MAR ATHANASIUS COLLEGE OF ENGINEERING
KOTHAMANGALAM – 686666
(Govt. Aided Autonomous Institution)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B. TECH FIRST SERIES EXAMINATION, AUGUST 2026

(S5 ECE A &B) B24EC3P13 OPTICAL FIBER COMMUNICATION

Max. Marks: 40 Duration: 1.5 Hours

PART A

Answer all questions. Each question carries 3 marks.

1. Define Mode Field Diameter (MFD) in a single-mode optical fiber. Explain how it is determined using the Gaussian intensity distribution and state its significance. (CO1)
2. Differentiate between Skew Ray, Meridional Ray and Axial Ray. (CO1)
3. Discuss the causes, effects, and prevention of Mie scattering in optical fibers. (CO2)
4. Explain the absorption mechanisms using fiber loss curve. (CO2)

PART B

Answer all questions. Each question carries 14 marks.

5. a. For a step index fiber n_1=1.465 and n_2= 1.46, normalized frequency is 2.4. Calculate the core radius and NA at 0.8 μm. (CO1)

   b. Derive the expression for Numerical Aperture in terms of the relative refractive index difference (Δ) and explain its importance. (CO1)

PTO

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6. a. Explain the Nonlinear scattering mechanisms occurred in optical fiber cable. (CO2)

b. Determine the attenuation in dB/km due to Rayleigh scattering in silica at an operating wavelength of 700nm.silica has fictive temperature of 1400 K with isothermal compressibility of $7x10^{-11}m^2N^{-1}$. Refractive index is 1.46 and the photo elastic coefficient is 0.29. (CO2)

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