Name: ……

Roll No: ……....

MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM

(Govt. Aided. Autonomous Institution)

B. TECH FIRST SERIES EXAMINATION, AUGUST 2026

ELECTRONICS AND COMMUNICATION ENGINEERING-S7EC(A&B)

PROGRAM ELECTIVE II - OPTICAL FIBER COMMUNICATION (ECT413)

Maximum: 40 Marks Time: 1.5 Hour

Answer all Questions

Part A (4 Questions x 3 marks =12marks)

1) Compare the three paths that the ray can propagate along an optical fiber. [CO1]
2) Define Acceptance angle and total internal reflection. [CO1]
3) Relate with equations the relationship between the numerical aperture, acceptance angle and the relative refractive index difference. [CO2]
4) A silicon optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and a cladding refractive index of 1.47. Determine the critical angle at core-cladding interface, the NA of the fiber, the acceptance angle in air for the fiber. [CO2]

Part B (4 Questions x 7 marks =28marks)

5) When interference phenomena is considered, it is found that only rays with certain discrete characteristics or a discrete number of guided modes propagate through the fiber core. Justify the above statement. [CO1] (7 Marks)
6) Explain the mode field diameter and cut off wavelength with appropriate diagrams and equations. [CO1] (7 Marks)
7) For the multimode step index fibers the refractive index profile and the V number is different from single mode fibres. Substantiate the statement. [CO2] (7 Marks)
8) Compare between the multimode and single mode fibers. [CO2] (7 Marks)

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Advance the field of Electronics and Communication by developing and disseminating innovative practices and technologies.

Nurture technically competent professionals in Electronics and Communication Engineering equipped with the skills to address global challenges.

Foster socially responsible technocrats and entrepreneurs who contribute positively to society through their expertise and leadership.