MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM

(GOVERNMENT AIDED AUTONOMOUS ENGINEERING COLLEGE)

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

First Sessional Examination August 2026

B24EE2T03 DIGITAL ELECTRONICS

(S3_EA & EB)

Max. Marks 40 Time: 1.5 Hours

Answer all questions from Part A and Part B

PART A (4X3=12 Marks)

1. Perform 49 - 84 using 8 bit 2's complement arithmetic. (CO1)
2. Convert the decimal number 53 to gray code. (CO1)
3. Implement the logic $F = \sum_m(0,1,2,4,6)$ using NAND gates only. (CO2)
4. Represent $F = \bar{A}BC + B\bar{C}\bar{D} + AB$ in Canonical SOP form. (CO2)

PART B (2X14=28 marks)

5. Convert
   a. $(2D5)_{16}$ to binary and decimal numbers
   b. $(376)_8$ to hexadecimal and decimal numbers
   c. $(1011.101)_2$ to decimal number (6+6+2=14 Marks) (CO1)

6. a. A hostel room can be booked only if a student satisfies enough eligibility criteria.
   A: CGPA ≥ 8.0, **B**: No disciplinary action, **C**: Fee paid, **D**: Attendance ≥ 75%
   The booking is approved if:
   The hostel fee has been paid, and either
   i) the student has a CGPA ≥ 8.0, or
   ii) the student has both a clean disciplinary record and attendance ≥ 75%.
   Develop the truth table and implement a digital logic circuit for the hostel room booking system.

   b. Simplify the expression $Y = \sum_m(7,9,10,11,12,13,14,15)$

   (7+7=14 Marks) (CO2)

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CO1- Students will be able to understand various number systems, codes, and logic gates and perform binary arithmetic operations.

CO2- Students will be able to apply Boolean laws and theorems, utilize K-map for the minimization of Boolean expressions, and design digital circuits.