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) B24EC3T05 - EMBEDDED SYSTEMS

Max. Marks: 40 Duration: 1.5 Hours

PART A

Answer all questions. Each question carries 3 marks.

1. Justify the reason for not considering a personal computer as an embedded system. (CO1)
2. An aerospace company is developing the embedded control software for an unmanned aerial vehicle. The engineering team uses both simulators and emulators during the development process. Differentiate between a simulator and an emulator, giving the purpose of each. (CO1)
3. As an embedded systems engineer, you are developing an automated smart irrigation system for agricultural fields. Mention which sensors and actuators you would use in the system and justify their use. (CO1)
4. Explain the reason for using the L293D IC while interfacing a DC motor with a microcontroller. (CO2)

PART B

Answer all questions. Each question carries 14 marks.

5. a) With the help of a diagram, explain the general hardware architecture of an embedded system. (8 marks, CO1)

5. b) An automobile manufacturer is developing the firmware for a new Engine Control Unit (ECU). Before the vehicles can be shipped, the software must be converted into a ROM image and programmed into the microcontroller's memory. Explain the process of creating the ROM image with the help of a diagram. (6 marks, CO1)

6. a) A home automation company is developing a smart door lock that uses a keypad for password-based access. The system uses a 4 × 4 matrix keypad for user input. Draw and explain the interfacing diagram of the keypad with an 8051 microcontroller. Also, write a C program to scan the keypad and send the hexadecimal code of the pressed key to an output port (no need to handle switch debouncing). (8 marks, CO2)

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6. b) A consumer electronics company is developing the firmware for a new microwave oven. Since the product specifications are fixed, the company has decided to follow the Waterfall life cycle model. Explain the different phases of the Waterfall life cycle model with a diagram. (6 marks, CO1)