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

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

B.TECH SECOND SERIES EXAMINATION, OCTOBER 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. An 8051-based embedded system uses an ADC0804 to monitor an analog sensor voltage. If the $V_{ref}/2$ pin of the ADC0804 is connected to 2 V, determine the minimum change in the sensor output voltage required to produce a one-bit change in the ADC's digital output. (CO2)

2. A digital system uses SRAM and DRAM for data storage. Differentiate between SRAM and DRAM in the context of their properties. (CO3)

3. An HDLC transmitter has to send a bit stream '11100011111011111111001' using an HDLC synchronous link. Compose the data field that will actually be transmitted after bit stuffing and justify your answer. (CO3)

4. An embedded system processor operates in two different modes while executing various types of programs. Differentiate between the user mode and the supervisory mode of operation of the processor. (CO5)

PART B

Answer all questions. Each question carries 14 marks.

5. a) An 8051-based digital clock system uses a DS12887 RTC to maintain the current time. Design the interfacing circuit and develop an Embedded C program to read and display the hours and minutes from the RTC. (8 marks, CO2)

5. b) An automotive electronic control unit (ECU) uses the CAN protocol to exchange data with other ECUs. Explain the CAN data frame format used for transmitting messages between the ECUs with a neat diagram. (6 marks, CO3)

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6. a) An embedded system in an industrial monitoring unit uses an operating system for its proper functioning. Explain the major functions performed by the OS kernel. (8 marks, CO5)

6. b) With the help of a sample scenario, explain the sequence of steps involved in executing the Interrupt Service Routine after an interrupt is received. (6 marks, CO3)