QP Code:ECM41-1 **(Pages:2)**

Reg No : ..... Name : .....

MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM

(Govt. Aided Autonomous Institution)

Fourth Semester B.Tech. Degree Examination, May, 2026

Course Code: B24ECM41

Course Name: MICROCONTROLLERS

Max. Marks: 100 Duration:3 Hours

PART - A: 30 Marks (10 Qns x 3 Marks)

Answer all questions

1. Give the address range of the register banks in the 8051 internal RAM.
2. Sketch the block diagram of the 8051 microcontroller.
3. List the data types supported in 8051 C with example values.
4. Outline the function of control transfer (branching) instructions.
5. How is a delay generated using a loop in 8051 assembly language?
6. What is the purpose of using CJNE instruction in finding largest/smallest numbers?
7. Write the steps to find the values to be loaded into the Timer to get desired delay.
8. With XTAL = 11.0592 MHz, find the TH1 value needed to have the following baud rates. (a) 9600 (b) 2400 (c) 1200
9. Write the vector address of Timer 0, Timer1 and Serial interrupts.
10. Mention the steps involved in initializing an LCD.

PART - B: 70 Marks (5 Qns x 14 Marks)

Answer any one full question from each module.

Module 1

11. a) Choose a real-world application, such as a microwave oven or a security alarm system. Explain why a microcontroller is the ideal choice for this system. Additionally, describe three key features of the 8051 microcontroller that would be essential for its successful implementation in your chosen application. (8 Marks)

    b) Differentiate between a microprocessor and a microcontroller based on their core components and typical use cases. (6 Marks)

OR

12. Explain the pins of 8051 with the help of pin diagram.

Module 2

13. Ten hex numbers are stored in RAM locations 50H onwards. Write an ALP to find the biggest number in the set. Biggest number should finally be saved in 60H.

OR

14. a) Write an ALP to transfer the contents of the registers A,R0, and R1 respectively of bank 0 to the registers B,R0 and R1 of bank 1 using proper instructions. (7 marks)

b) Write an ALP to take 10 bytes of data from RAM location 45H to 4EH, add 02H to each of them and save the result in RAM locations 79H down to 70H. (7 Marks)

Module 3

15. Explain active LOW switch interfacing with 8051. Write a program to control an LED accordingly and explain the logic.

OR

16. Describe the functional differences between Port 0, Port 1, Port 2, and Port 3 of 8051.

Module 4

17. Write an 8051 assembly or C program for serial data transmission and reception.

OR

18. Explain the RS-232 standard in detail.

Module 5

19. Explain the interfacing of an 8-bit ADC (ADC0804) with 8051 using a neat diagram. Write a simple program to convert the analog data.

OR

20. a) Write a program in which the 8051 reads data from P1 and writes it to P2 continuously while giving a copy of it to the serial COM port to be transferred serially. Assume that XTAL=11.0592 MHz. Set the baud rate at 9600. (10 Marks)

b) Write the steps in executing an interrupt. (4 Marks)

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