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Name :

**MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM**

(Govt. Aided Autonomous Institution)

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

Course Code: B24EE2T08

Course Name: MICROPROCESSORS AND MICROCONTROLLERS

Max. Marks: 100

Duration:3 Hours

PART - A: 30 Marks (10 Qns x 3 Marks)**Answer all questions**

1. Differentiate DCR B and DCX B instruction of 8085 microprocessor.
2. Illustrate the operation of the 8085 microprocessor instruction XTHL.
3. Explain the 8085 vectored interrupts. Which is a non maskable interrupt?
4. List conditional call instructions of 8085 microprocessor .
5. Implement the code for inbuilt LED blinking.
6. Write the basic steps to create and upload an Arduino program.
7. Differentiate between built-in functions and user-defined functions.
8. Explain the use of analogRead() function in potentiometer interfacing in Arduino.
9. Describe the functions of power pins and ground pins in Raspberry Pi.
10. Draw the format of data transfer ARM instruction.

PART - B: 70 Marks (5 Qns x 14 Marks)**Answer any One full question from each module.****Module 1**

11. a. Illustrate the steps and timing of the data flow when the instruction code 4FH – MOV C, A (9 Marks)
stored in location 2005H is being fetched.
- b. Elaborate the term instruction cycle in 8085 microprocessor (5 Marks)

OR

12. a. Point out the importance of i) Flag flipflops ii) Instruction decoder in 8085 microprocessor (8 marks)
architecture.
- b. Illustrate the 8085 microprocessor Bus structure and explain briefly. (6 marks)

Module 2

13. a. Develop a delay routine using a 8-bit register to produce a time delay of 0.5 ms in 8085 microprocessor-based system whose clock frequency is 3 MHz. (8 Marks)
- b. Write a 8085 program to add two BCD numbers and store the BCD result in 2050H by using direct addressing mode. (6 Marks)

OR

14. a. Develop the algorithm and assembly language program for 8085 to sort numbers in ascending order in a four element data array. (9 Marks)
- b. Elaborate the Conditional return instructions based on status flags. (5 Marks)

Module 3

15. a. Explain the digital and analog I/O ports available in Arduino UNO. Illustrate how they can be used as inputs and outputs with examples. (8 marks)
- b. Discuss the timer modules available in the Arduino UNO. (6 marks)

OR

16. a. List out the applications and challenges in embedded systems. (7 marks)
- b. Differentiate between hard and soft real time system. (7 marks)

Module 4

17. a. Write a complete Arduino sketch to blink an LED on Pin 13 with an "ON" time of 1 sec and an "OFF" time of 1 second. Modify the program so that the LED only blinks if a switch connected to Pin 2 is pressed (High). (10 marks)
- b. List the Arduino library and functions used for LCD interfacing. (4 marks)

OR

18. a. Write an Arduino program to control the speed of a DC motor using a potentiometer. (10 marks)
- b. Explain the function of analogWrite() command in sensor interfacing with Arduino. (4 marks)

Module 5

19. a. Draw and explain 3 stage pipelining in ARM organization. (8marks)
- b. Give the schematic of a Current Program Status Register of ARM processor and explain the individual bits. (6 marks)

OR

20. a. Describe the architecture of SoC used in Raspberry Pi. (8 marks)
- b. Differentiate between Raspberry Pi 3 and Raspberry Pi 4 models. (6 marks)
