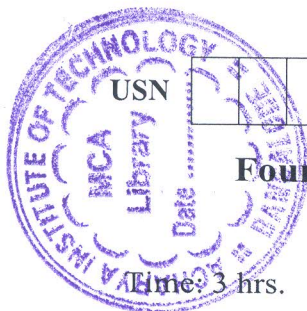


# CBCS SCHEME



USN

18MT43

Fourth Semester B.E. Degree Examination, July/August 2022

## Microcontroller

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. With a neat sketch, explain the architecture of 8051 microcontroller. (12 Marks)  
b. List out the difference between microcontroller and microprocessor. (08 Marks)

OR

- 2 a. With a neat sketch, briefly explain the internal memory organization of 8051 microcontroller. (10 Marks)  
b. With the help of timing diagram, explain how to interface 8K EPROM and 4K RAM to 8051. (10 Marks)

### Module-2

- 3 a. Define addressing modes. Explain different addressing modes with an example for each. Also write a code to interchange the content of R4 and R5 in two different methods. (12 Marks)  
b. With a neat sketch, explain the different ranges of JUMP instruction. (08 Marks)

OR

- 4 a. Find the syntax error if any. Also correct the instruction in case of error:  
(i) XCHB R0, @R1 (ii) PUSH R5 (iii) MOV R1, @DPTR  
(iv) SWAP AB (v) SUB A, R0 (10 Marks)  
b. Write an ALP to separate positive and negative numbers stored in an array of 10 bytes stored in an address 9400h. Store the positive numbers from 30h onwards and negative from 40h onwards. (10 Marks)

### Module-3

- 5 a. Explain different data types supported by 8051 with an example for each. Also mention the two ways of waiting for the delay in 8051. (10 Marks)  
b. Write a C code to check the data integrity using checksum method for the data bytes 32h, 44h, 68h, 27h. If the data is good send "G" to P1 else "B" to P1. (10 Marks)

OR

- 6 a. Write an ALP and also C code to generate a wave of 50% duty cycle of frequency 100 kHz, on pin P2.3. Use Timer 1 in mode 1 with XTAL = 22 MHz. (10 Marks)  
b. Briefly explain the factors that can affect the accuracy of the delay. Also write an 8051 C program to convert ASCII digits '4' and '7' to packed BCD and display them as P1. (10 Marks)

### Module-4

- 7 a. With a neat sketch, explain the Handshake signals of RS232. Also write null modem connection diagram. (10 Marks)  
b. With a neat sketch, explain the SCON register. Also write an ALP to transmit data "Hello Mechatronics" serially at 9600 baud rate, use 8 bit data and 1 stop bit. XTAL = 11.0592 MHz. Use Timer 1. (10 Marks)

OR

- 8 a. Explain different interrupts of 8051. Also write the interrupt vector table. (08 Marks)
- b. Explain different steps involved in executing an interrupt. Also :
- (i) Program the IP register to assign the highest priority to INT1
  - (ii) Then discuss what happens if INT0, INT1 and TF0 are activated at the same time. (12 Marks)

**Module-5**

- 9 a. With a neat sketch, explain the pin descriptions for LCD. Also write a 8051 C program to send letters 'M', 'T' to the LCD using delays. (10 Marks)
- b. With a neat sketch and flow chart, explain the interfacing of keyboard matrix with 8051 microcontroller. (10 Marks)

OR

- 10 a. A switch is connected to pin P2.7. Write a program to monitor the status of SW and perform the following:
- (i) If SW = 0, the stepper motor moves clockwise
  - (ii) If SW = 1, the stepper motor moves counter clockwise. (10 Marks)
- b. 8051 microcontroller is interfaced with DAC. Assume a switch is connected to pin P0.0. Write a program to do the following:
- (i) When SW = 0, the DAC output gives a staircase waveform.
  - (ii) When SW = 1, the DAC output gives a triangular waveform. (10 Marks)

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