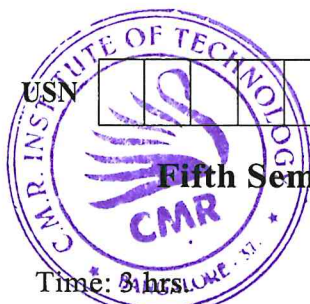


# CBCS SCHEME



17EE52

Fifth 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. What is microcontroller? Compare microprocessor and microcontroller. (04 Marks)
- b. Explain the block diagram of 8051 microcontroller. (10 Marks)
- c. Explain the program status word and flag bits. (06 Marks)

OR

- 2 a. Explain the internal RAM organization of 8051 with a neat diagram. (08 Marks)
- b. How many address lines are required for accessing the data in the following memory ICS while data is organized as bytes. (i) 1024 byte ROM (ii) 16K RAM (04 Marks)
- c. Explain the various addressing modes of 8051 with an example for each. (08 Marks)

### Module-2

- 3 a. What are assembler directives? Explain various assembler directives. (08 Marks)
- b. Explain the operation of following instruction of 8051:  
(i) MUL AB (ii) DIV AB (iii) SWAP A (iv) ADD A, @R<sub>0</sub> (08 Marks)
- c. Write a program to convert decimal digit to displayable ASCII digits. (04 Marks)

OR

- 4 a. With a neat diagram, explain the range of JUMP and CALL instruction. (08 Marks)
- b. Identify the addressing modes in the following instructions:  
(i) MOV A, 45H (ii) ADD A, #0 (iii) INC R2 (iv) MOV A, @R<sub>0</sub> (04 Marks)
- c. Write a program to toggle the bits of port 1 with a delay which depends on the value of a number in R<sub>0</sub>. (08 Marks)

### Module-3

- 5 a. Explain the various data types in 8051 C. (08 Marks)
- b. Write an 8051 C program to convert ASCII digit of '4' and '7' to packed BCD and display them on P1. (06 Marks)
- c. With a frequency of 22 MHz, generate a frequency of 100 kHz on pin P2.3. Use timer 1 in the mode 1. (06 Marks)

OR

- 6 a. Describe bits of TMOD register and various operating modes in detail. (10 Marks)
- b. Write an 8051 C program to toggle all bits of P2 continuously every 500 ms. Use Timer 7, mode 1 to create the delay. (10 Marks)

### Module-4

- 7 a. What is serial data communication? Explain Simplex, half duplex and full duplex transfer. (06 Marks)
- b. Explain the use of various bits of SCON SFR. (08 Marks)
- c. Write a C program for the 8051 to transfer the letter 'A' serially at 4800 baud continuously. Use 8 bit data and 1 stop bit. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 8 a. What is an interrupt? Explain the steps in executing an interrupt. (08 Marks)  
b. Describe the bits of TCON register. (06 Marks)  
c. With XTAL = 11.0592 MHz, find the TH1 value needed to have the following baud rates:  
(i) 9600 (ii) 2400 (iii) 1200 (06 Marks)

**Module-5**

- 9 a. Explain matrix keyboard connection to ports of 8051. (08 Marks)  
b. Write short notes on:  
(i) MAX 1112 ADC  
(ii) DAC 0808  
(iii) Relay and Relay diagram (12 Marks)

CMRIT LIBRARY  
BANGALORE - 560 037

OR

- 10 a. Draw the control word format of 8255 and explain various modes of 8255. (08 Marks)  
b. Define Stepper motor and explain 8051 connection to stepper motor. (06 Marks)  
c. A switch is connected to pin P2.7. Write a C 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. (06 Marks)

\*\*\*\*\*