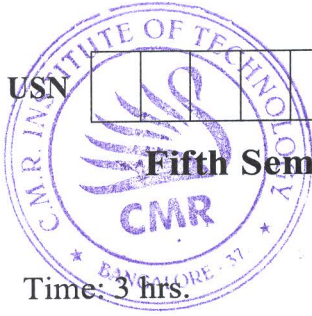


# CBCS SCHEME



17EE52

## Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024 Microcontroller

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. Distinguish between : (i) GPP and Microcontroller (ii) RISC and CISC Machines. (08 Marks)
- b. What is stack? Explain the functions of PUSH and POP with examples. (08 Marks)
- c. For the following microcontrollers ICs, determine the ROM memory address of AT89C51 with 4 KB, DS89C420 with 16 KB and DS 5000 with 32 KB. (04 Marks)

**OR**

- 2 a. Explain the internal RAM organization of 8051 with suitable diagrams. (08 Marks)
- b. Explain the bit pattern of program status word register. (08 Marks)
- c. Identify the addressing modes of the following instructions:  
(i) MOV A, #25H (ii) MOV A, @R<sub>i</sub>  
(iii) MOV C, @A+PC (iv) CLR C (04 Marks)

### Module-2

- 3 a. Explain the functions of the assembler directives DB, EQU, END, ORG. (08 Marks)
- b. Briefly explain the steps involved to create a program in an ALP. (08 Marks)
- c. Explain the following instructions with examples:  
(i) DA A (ii) SUBB A, R<sub>2</sub> (04 Marks)

**OR**

- 4 a. Write 8051 ALP which checks whether the ten numbers stored from external RAM memory address 3000H are positive/negative. The program should store accordingly 00H/FFH from internal RAM location 30H onwards. (10 Marks)
- b. Find the contents of A and carry flag after the execution of the following instructions. Assume [A] = 25H and [C] = 1 before the execution of instructions.  
ADD A, #25H  
SUBB A, #50H  
ADDC A, #0FCH (06 Marks)
- c. A student has taken 6 courses in a semester the marks of the student out of 25 are stored in RAM locations 50h onwards. Write a program to find the average marks and save it in R<sub>6</sub>. (04 Marks)

### Module-3

- 5 a. Write an 8051 C program to read the content of port P<sub>1</sub>. If it is greater than 200, wait for 250 msec and send the data to port P<sub>2</sub>, otherwise wait for 150 msec and send the data to port P<sub>0</sub>. (08 Marks)
- b. Write an 8051 C program to convert ASCII digits of 4 and 7 to packed BCD and display them on P<sub>1</sub>. (08 Marks)
- c. Explain with an example, bitwise logic operators for 8051 C. (04 Marks)

OR

- 6 a. Explain about timer/counter control logic diagram and also briefly explain various timers mode of operation. (08 Marks)
- b. Write an ALP to generate 5 kHz square wave on P2.7 using timer 1 in mode 2. Assume 11.0592 MHz crystal oscillator. (06 Marks)
- c. Write 8051 C program to toggle only bit P1.5 continuously every 50 ms. Use timer 0, mode 1 to create delay. (06 Marks)

Module-4

- 7 a. Write the steps required for programming 8051 to transfer data serially. (06 Marks)
- b. Write an ALP to transmit "VTU EXAMS" at 9600 baud to a PC using serial port. (06 Marks)
- c. Write an 8051 C program to send two strings to serial port. Monitor switch SW connected to pin P2.0 and make decision as SW = 0, send "NO", SW = 1 send "YES". Assume XTAL = 11.0592 MHz, baud rate = 9600, 8 bit data, 1 stop bit. (08 Marks)

OR

- 8 a. Explain the interrupts of 8051 clearly mentioning the vector address and priorities. (08 Marks)
- b. Explain the bit pattern of IE register. Also mention the steps involved in enabling an interrupt. (06 Marks)
- c. Write an ALP that continuously gets 8 bit data from P<sub>0</sub> and sends it to P<sub>1</sub> while simultaneously creating a square wave of 200  $\mu$ s period on pin P2.1. Use timer 0, mode 2 to create square wave, XTAL = 11.0592 MHz. (06 Marks)

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- 9 a. Interface an LCD display to 8051 and write an ALP to display the message "HELLO". (10 Marks)
- b. Explain the internal architecture of ADC 0804 and its timing diagram to convert analog data to digital form. (10 Marks)

OR

- 10 a. 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, stepper motor moves clockwise  
(ii) If SW = 1, stepper motor moves counter clockwise (10 Marks)
- b. Explain the various modes of 8255 and find the control word for the following configurations:  
(i) All ports of A, B and C are o/p ports (mode '0')  
(ii) P<sub>A</sub> = IN, P<sub>B</sub> = OUT, P<sub>C</sub>L = OUT and P<sub>C</sub>H = OUT. (10 Marks)

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