CBCS SCHEME

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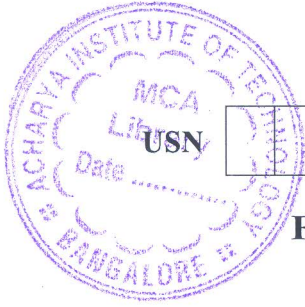
Fourth Semester B.E. Degree Examination, June/July 2023
Microcontroller

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 block diagram, explain the architecture of 8051 microcontroller.   **(08 Marks)**
    b. Explain memory organization of 8051 with suitable diagram.   **(08 Marks)**
    c. Differentiate between microprocessor and microcontroller.   **(04 Marks)**

OR

2   a. Draw and explain PSW of 8051MC. Calculate the status of CY, AC and P flags after the addition of i) 9CH and 64H   ii) 91H and 92H.   **(06 Marks)**
    b. Explain the register organization of 8051.   **(06 Marks)**
    c. Write short note on special function registers.   **(08 Marks)**

Module-2

3   a. Classify the CALL instructions in 8051. Explain each with examples.   **(06 Marks)**
    b. Write a program to add 5, 8 bit numbers stored in consecutive locations starting from 2200h and store result in 2300h and 2301h.   **(06 Marks)**
    c. Write short note on all addressing modes.   **(08 Marks)**

OR

4   a. Explain need for subroutines. Write a subroutines which checks the content of location 20H. If it is a positive number, the subroutine finds the 2's complement and store in same location and return.   **(08 Marks)**
    b. Write a note on bit manipulation instructions.   **(06 Marks)**
    c. Explain stack, stack pointer and stack instructions.   **(06 Marks)**

Module-3

5   a. Write a program in 8051C to toggle all the bits of port 1 continuously.   **(06 Marks)**
    b. For a machine cycle of 1.085 µs, find the time delay in following subroutine.
    delay : MOV R_2, #200
    AGAIN : MOV R_3, #OFFh
    here : NOP
             NOP
             DJNZ R_3, here
             DJNZ R_2, again
             ret   **(06 Marks)**
    c. Explain the bit contents of TCON and TMOD registers.   **(08 Marks)**

OR

6 a. If the crystal frequency is 8MHz, find the time taken to execute the following program
MOV R₂, #04
MOV R₁, #06
Wait : DJNZ R₂, wait. **(06 Marks)**

b. Write a program to set up a hex up counter to count continuously and display from OO to FF with a delay. **(06 Marks)**

c. What are assembler directives? How it is different from assembler? Explain any 4 of them. **(08 Marks)**

Module-4

7 a. Explain in detail interrupts, ISR and types of interrupts. **(08 Marks)**

b. Explain serial control register in detail. **(08 Marks)**

c. Explain RS_232 standards for DB-9P connector. **(04 Marks)**

OR

8 a. Write a C program for 8051 to transfer letter YES serially at a band rate of 9600 continuously. Use 8 bit data and 1 stop bit. **(10 Marks)**

b. Write an 8051 ALP to send data message "MICROCONTROLLERS" of length 16 character at a band rate of 9600, 8 bit data, 1 stop bit serially. **(10 Marks)**

Module-5

9 a. With neat diagram write an assembly language program to interface DAC to 8051 μc. **(10 Marks)**

b. Write an ALP to rotate the stepper motor clockwise/anticlockwise with full step sequence. **(10 Marks)**

OR

10 a. What is interfacing? Write an ALP to generate a triangular waveform. **(10 Marks)**

b. Explain the pin description of ADC804. Explain how to interface DC motor with 8051. **(10 Marks)**

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