USN

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Microcontrollers

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1   a.   Bring out the difference between microprocessor and microcontroller.   **(05 Marks)**

    b.   With a neat architecture diagram explain the architectural features of 8051 microcontroller.
                                                                                          (10 Marks)

    c.   Explain the following terms :
         i) Stack and Stack pointer   ii) Data pointer and program counter.   **(05 Marks)**

OR

2   a.   Explain the bit contents of Program Status Word (PSW).   **(06 Marks)**

    b.   Write circuit diagram of Port 1, explain input and output operations in 8051 using Port 1.
                                                                                          (08 Marks)

    c.   Explain the internal RAM organization in 8051.   **(06 Marks)**

Module-2

3   a.   Explain five different addressing mode with an example.   **(10 Marks)**

    b.   Write an ALP to add 2-16 bit numbers 3CE7h and 368Bh.   **(05 Marks)**

    c.   Explain swap and rotate instruction with an example.   **(05 Marks)**

OR

4   a.   List and explain byte level logical operation (any five).   **(06 Marks)**

    b.   Write an ALP to convert a packed BCD number to ASCII number. Store result in R5 and R6
         respectively.   **(08 Marks)**

    c.   Write an ALP to convert hexadecimal to decimal number. Store results in 31h location.
                                                                                          (06 Marks)

Module-3

5   a.   With a neat diagram, explain the range of jump instruction.   **(07 Marks)**

    b.   Explain the role of call and subroutine in 8051 with an example.   **(07 Marks)**

    c.   Write an ALP to move block of data from 30h location to 40h location (any five 8-bit data)
         using jump instruction.   **(06 Marks)**

OR

6 a. Write a 8051 C-program to toggle the bits of P1 ports continuously with a 250 ms delay.

(06 Marks)

   b. Explain the bitwise logical operator in C with an example. (08 Marks)

   c. Explain the different data types in 8051 C-programming with size and range. (06 Marks)

Module-4

7 a. Write an ALP to transfer "ECE" serially at 9600 baud rate, 8 bit data, 1 stop bit continuously. (07 Marks)

   b. Explain the bit contents of TMOD register. (06 Marks)

   c. Write an ALP to generate a square wave with an ON-time of 3 ms and OFF time of 10 ms on all pins of Port 0. Assume an XTAL of 22 MHz. (07 Marks)

OR

8 a. Explain how timers are programmed in Mode 1 with diagram. (07 Marks)

   b. Explain the bit content of SCON-register. (07 Marks)

   c. Explain RS232 DB-9 pins connector. (06 Marks)

Module-5

9 a. Explain the bit content of IE register. (05 Marks)

   b. List the steps involved in executing interrupt in 8051 microcontroller. (05 Marks)

   c. Write an ALP to interface stepper motor clockwise to 8051 microcontroller with diagram. (10 Marks)

OR

10 a. Write an ALP and C-program for ADC 0804. (10 Marks)

   b. With a neat diagram, write an ALP to interface LCD to microcontroller 8051 using busy flag. (10 Marks)

* * * * *