USN | | | | | | | | | |

15EC563

Fifth Semester B.E. Degree Examination, Jan./Feb. 2023
8051 Microcontroller

Time: 3 hrs.

Max. Marks: 80

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

Module-1

1 a. Show with a neat diagram how a microcontroller interfaces external memory. **(08 Marks)**
   b. Explain with a diagram the significance of each bit of the PSW [Program Status Word].
   (08 Marks)

OR

2 a. Explain atleast two features each of the I/O ports of 8051 microcontroller with diagrams.
   (08 Marks)
   b. With neat diagrams explain the stack operations in 8051 microcontroller. **(08 Marks)**

Module-2

3 a. Identify the addressing mode of the following instructions and specify the operation of each:
   i) MOV DPTR, #0ABCDh
   ii) ADD A, R5
   iii) MOV A, 2
   iv) MOVC A, @A+DPTR **(08 Marks)**
   b. Write a code to send 55h to ports P_1 and P_2. **(02 Marks)**
   c. Identify the error in the following instructions and write the corrected form:
   i) MOV R7, R2
   ii) CJNE R5, #0FFh **(06 Marks)**

OR

4 a. Assume that we have 4 bytes of hexadecimal data: 25h, 62h, 3Fh and 52h.
   i) Find the checksum byte.
   ii) Perform the checksum operation to ensure data integrity.
   iii) If the second byte 62h has been changed to 22h show how the checksum detects the
   error. **(08 Marks)**
   b. What is in register A after the execution of the following code?
   MOV A, #85h
   SWAP A
   ANL A, #0F0h **(02 Marks)**
   c. What is the value of register A after each of the following instructions?
   MOV A, #0A2h
   RL A
   RL A
   RL A
   RL A **(06 Marks)**

Module-3

5 a. Write an assembly language program for 8051 microcontroller to add 2Ch, 3Ah, 89h and
   06h and store the result in memory location 8000h. **(08 Marks)**

b. If the crystal frequency of 8051 microcontroller is 11.0592 MHz find the time taken to execute the following delay program:

```
                            Machine cycles
DELAY : MOV  R2 , #0Ah        1
MAIN  : MOV  R1, #10h         1
WAIT  : DJNZ R1, WAIT         2
        DJNZ R2, MAIN         2
        RET                   2
```
(08 Marks)

OR

6 a. Write an assembly language program to toggle an LED whenever a push button is pressed. Push button is connected to $P_{0.0}$ and LED to $P_{0.7}$. **(08 Marks)**

b. Write an assembly language program to pick the largest of five 8 bit numbers and store the largest number in memory location 5000h. **(08 Marks)**

Module-4

7 a. Explain with a diagram the significance of all the bits of the TMOD special function register. **(10 Marks)**

b. Show the details of MAX232 converter chip and its connection to 8051 for serial data transfers. **(06 Marks)**

OR

8 a. Explain the significance of all the bits of the TCON special function register. **(10 Marks)**

b. With a crystal frequency of 11.0592 MHz find THI value needed to have the following baud rates.
   i) 9600   ii) 2400   iii) 1200 **(06 Marks)**

Module-5

9 a. What are the steps involved in enabling an interrupt in 8051 microcontroller? Give the significance of each bit of IE register. **(08 Marks)**

b. Write an assembly language program to rotate a stepper motor 64° in the anticlockwise direction. The motor has a step angle of 2°. Use the 4-step sequence given below.

Step No.	Winding A	Winding B	Winding C	Winding D
1	1	0	0	1
2	1	1	0	0
3	0	1	1	0
4	0	0	1	1

(08 Marks)

OR

10 a. How are priorities assigned to interrupts using the IP register? **(08 Marks)**

b. Draw the connection of ADC0804 to 8051 with self clocking and write the assembly language program to convert analog signal to digital (hexadecimal). **(08 Marks)**

* * * * *