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18EC46

Fourth Semester B.E. Degree Examination, Dec.2024/Jan.2025
Microcontroller

Time: 3 hrs.

Max. Marks: 100

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

Module-1

1 a. Differentiate between micro-processor and microcontroller with respect to their architecture and instructor. **(08 Marks)**

   b. Explain the significance of process status word. Briefly discuss PSW register of 8051. **(06 Marks)**

   c. Explain the functions of the following pins of 8051 i) EA ii) ALE iii) RST. **(06 Marks)**

OR

2 a. With the help of neat diagram, explain the internal block diagram of 8051. **(10 Marks)**

   b. Briefly explain the dual functions of port 3 pins of 8051. **(04 Marks)**

   c. With the help of diagram, explain how to interface 8 KB EPROM and 8K RAM to 8051 micro-controller. **(06 Marks)**

Module-2

3 a. Explain with examples the different addressing modes used in 8051. **(08 Marks)**

   b. Explain the operations of the 8051 instructions
      i) DAA   ii) MUL AB **(08 Marks)**

   c. Explain the different types of jump instructions in 8051. **(04 Marks)**

OR

4 a. Name the addressing modes of the following instruction and give an example for each.
      i)   CJNE dest, source target
      ii) ACALL target
      iii) DJNZ R1, rel
      iv) SWAP A
      v)   DA A **(04 Marks)**

   b. Explain with examples the PUSH and POP instructions. **(08 Marks)**

   c. Explain the operations performed by the following instructions.
      i) MOVC A, @ A + DPTR   ii) SWAP A   iii) XCHD A, @ Rp   iv) MUL AB. **(08 Marks)**

Module-3

5 a. Write an ALP in 8051 to count number of positive and negative numbers present in the internal memory block starting with address 20H, containing N bytes. Store the counts after the last data byte in the memory block. **(12 Marks)**

   b. Write a program in 8051 to find the sum of 20 bytes of data stored in an array of external RAM staring with address 2000H. Store the 16 bit sum at the end of array. **(08 Marks)**

OR

6   a.   Write an ALP to reach the given byte in the list of 50 numbers stored in consecutive memory locations 2000H. Assume that byte is 76H. If byte is not found store 00 at 2300 H and 2301H, if found store its address. **(08 Marks)**

    b.   Write an ALP to find Fibonacci series of N given terms. **(06 Marks)**

    c.   Write a program segment to realize the following :

    i)   Exchange contents of external data memory 8100 h with contents of internal data memory 40 h.

    ii) Exchange contents of A-register and B-register using stack. **(06 Marks)**

Module-4

7   a.   Explain Mode – 1 programming of timers in 8051. **(05 Marks)**

    b.   Write an ALP and C program to generate a frequency of 100 Hz square wave, using timer 0 in mode 1. Assume crystal frequency is 11.0592MHz. **(10 Marks)**

    c.   What is serial communication? Explain function of RS232C pins of DB-9 connector. **(05 Marks)**

OR

8   a.   Write on 8051 assembly language program to transfer the message "HELLO" serially at 9600 baud, 8 bit data, 1 stop bit. **(08 Marks)**

    b.   Explain the importance of TI and RI flags. **(06 Marks)**

    c.   Write an 8051 C program to toggle all bits of port 0 continuously. Use time '0' generate the delay of 1 sec between each toggle. **(06 Marks)**

Module-5

9   a.   Write an 8051 C to display the message 'VERY GOOD' on LCD display and show the interfacing circuit with functional pins of LCD. **(10 Marks)**

    b.   Interface a 4 × 4 keys keyboards to 8051 and write an ALP to send to key code to port whenever a key is pressed. **(10 Marks)**

OR

10 a.   Interface 8 bit, 8 channel ADC to 8051. Write an assembly language program to convert CH0, CH3 and CH7 and store result in external memory location starting from C000H. Repeat procedure for every 1 Sec. **(10 Marks)**

    b.   Show the interfacing of a stepper motor to 8051 and write a program to rotate stepper motor 5 rotations in clockwise direction and 10 rotations in anticlockwise direction with a delay between each step. **(10 Marks)**

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