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15EE52

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

Time: 3 hrs.

Max. Marks: 80

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

Module-1

1   a.   What is microcontroller? Compare microprocessor and microcontroller.   **(04 Marks)**

    b.   Explain with block diagram the architectural features of 8051μC and list out salient features of 8051μC.   **(08 Marks)**

    c.   Briefly explain about stack and stack pointer operation.   **(04 Marks)**

OR

2   a.   Define addressing mode. Explain the various types of addressing modes with an example with respect to 8051 microcontroller.   **(07 Marks)**

    b.   Explain the function of each bit in PSW register with flag status.   **(04 Marks)**

    c.   What is stack? Explain with example the PUSH and POP instructions.   **(05 Marks)**

Module-2

3   a.   What are assembler directives? Explain the function any four of them with an example.   **(06 Marks)**

    b.   Write an ALP to add two unsigned number stored in 40H and 41H, store the result in memory RAM location 50H and carry if any in 51H.   **(06 Marks)**

    c.   Differentiate between the following instructions :
      i) XCH and SWAP
      ii) SJMP and LJMP.   **(04 Marks)**

OR

4   a.   Explain the different types of conditional and unconditional jump instruction of 8051μC specify the different ranges associated with jump instructions.   **(06 Marks)**

    b.   Write an ALP to perform 16 bit × 8 bit multiplication.   **(05 Marks)**

    c.   Explain the following instruction with an examples :
      i) XCHD A,@ R_i
      ii) MOVC A, @A + DPTR.   **(05 Marks)**

Module-3

5   a.   Tabulate the different data types in C bits and the data ranges.   **(04 Marks)**

    b.   Write an 8051 C program to convert packed BCD 0 × 29 ; to ASCII and display the bytes on P1 and P2.   **(06 Marks)**

    c.   Write an 8051 C programs to toggle bits of port P1 continuously forever with some delay.   **(06 Marks)**

OR

6 a. What is the difference between timer and counter? Explain the function of each bit in TMOD register. **(04 Marks)**

   b. Write an ALP to generate square wave of 1.5 KHz frequency with 50% delay cycle on pin P2.1 using timer 0 in mode 1 operation. Assume XTAL = 12 MHz and show the delay calculation. **(06 Marks)**

   c. Assume that a 1 Hz external clock is being fed into pin T1(P3.5). Write a 8051 C program for counter 1 in mode 2 (8 bit autoreload) to count up and display the state of TLI count on P1 start the count at 0H. **(06 Marks)**

Module-4

7 a. Explain the bit status of SCON special function register. **(04 Marks)**

   b. Write an 8051 C program to transfer the message "YES" serially at 9600 baud rate, 8 bit data, and 1 stop bit. Do this continuously. **(06 Marks)**

   c. Write the steps required for programming 8051 to transfer data serially. **(06 Marks)**

OR

8 a. Define interrupt and mention the difference between interrupts and polling method. **(08 Marks)**

   b. Write an 8051 C program that continuously gets a single bit of data from P1.7 and sends it to P1.0, while simultaneously creating a square wave of 250 µs period on pin P2.5. Use timer 0 in mode 2 to create the square wave. Assume that XTAL = 11.0592 MHz. **(08 Marks)**

Module-5

9 a. Interface 4 × 4 matrix keyboard to the 8051 and explain how scanning and identity of the key pressed is done. **(08 Marks)**

   b. Explain with block diagram of DAC 0808 is connected to the 8051 micro controller at port P1. Write a 8051 program to triangular wave generator. **(08 Marks)**

OR

10 a. Draw the pin diagram of 8255 and briefly explain the signals. **(06 Marks)**

   b. Explain about stepper motor interface with neat diagram. Write a C program to rotate motor continuously (clockwise direction). Use the 4 step sequence. **(08 Marks)**

   c. Give the applications for a stepper motors popular. **(02 Marks)**

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