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18EE52

Fifth Semester B.E. Degree Examination, July/August 2022
Microcontroller

Time: 3 hrs.

Max. Marks: 100

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

Module-1

1 a. Draw architecture of 8051 microcontroller and mention its features. **(08 Marks)**
   b. What are addressing modes? With example explain four addressing modes. **(08 Marks)**
   c. Discuss the differences between Von-Neumann and Harvard architecture with neat sketch. **(04 Marks)**

OR

2 a. Interface 16K bytes of external RAM and 8 Kbytes of external ROM to 8051 microcontroller. Draw neat diagram. **(08 Marks)**
   b. With the format of program status word explain every bit of it. **(06 Marks)**
   c. Discuss internal RAM and ROM memory structure of 8051, with the diagram. **(06 Marks)**

Module-2

3 a. Write 8051 ALP to find factorial of a number. The number is stored in 1234h external memory. Store the result in external memory ABCDh. Let the number be "5h". **(08 Marks)**
   b. Explain following instruction :
      (i) DA A
      (ii) cjne r_0, #data, addr
      (iii) push and pop
      (iv) ANL A, r_1 & ANL C, p2.2 **(08 Marks)**
   c. What are assembler directives? Explain ORG, EQU and END directives with example. **(04 Marks)**

OR

4 a. Write 8051 ALP to find average of data stored from 30H to 35H internal memory of 8051. Store the average result in 50H memory. **(06 Marks)**
   b. What is range of jump? Explain relative absolute and long jump/call with example. **(08 Marks)**
   c. Write output for the following program:
      i) MOV A, #0FFH
         SETB C
         ADDC A, #02H
         STATUS OF CY & AC?
      ii) SETB C
          MOV A, #7AH
          SWAP A
          RLC A
          RLC A
          STATUS OF CY=? **(06 Marks)**

Module-3

5 a. Explain various data types of 8051C. **(06 Marks)**
   b. Write 8051 ALP to generate a square wave with ON Time of 3m sec and OFF time of 10m sec on all pins of port0. Use timer0, Mode1 with XTAL = 22MHz. **(08 Marks)**
   c. Brief out Auto Reload Mode of Time of 8051. **(06 Marks)**

OR

6 a. Write 8051C program to find checksum byte of data stream 30H, ABH, 6CH, 20H. Convert the checksum byte into decimal and display value of BCD digits in P0, P1 and P2. **(10 Marks)**

b. Explain TMOD register with the help of its format. **(06 Marks)**

c. Write 8051C program to bring data byte serially one bit at a time via P1.0 . The LSB bit should come first. **(04 Marks)**

Module-4

7 a. Explain IP and IE register of 8051. **(08 Marks)**

b. Write 8051C program with XTAL = 11.0592 MHz, baud rate = 9600, use interrupt to do the following :
   (i) Generate 10 kHz frequency at P2.1 using timer0, Mode2
   (ii) Use Timer1 as an event counter to count up and display it on P0. **(08 Marks)**

c. Explain three different modes of serial communication. **(04 Marks)**

OR

8 a. Explain SCON register with help of its format. **(06 Marks)**

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

c. Discuss handshake signals of RS232 used in 8051. **(06 Marks)**

d. Write the Interrupt service Routine address of all 5 interrupts. **(02 Marks)**

Module-5

9 a. Interface LCD to 8051 and write an 8051C program to send letters 'V', 'T' and 'U' to the LCD. Use appropriate delay. **(10 Marks)**

b. With the help of pin diagram explain ADC 0808 and write 8051C program to show digital output of ADC 0808. **(10 Marks)**

OR

10 a. Interface stepper motor to 8051 microcontroller. Write 8051C program to rotate stepper motor based on status of switch (SW) connected to P2.7. If SW = 0 rotate in clockwise direction and if SW = 1 rotate in anticlockwise direction. **(10 Marks)**

b. Briefly explain block diagram of 8255. **(05 Marks)**

c. Discuss control register of 8255. **(05 Marks)**

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