CBCS SCHEME

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17EE52

Fifth Semester B.E. Degree Examination, Feb./Mar. 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. List the differences between Microcontroller and Microprocessor. **(06 Marks)**

b. Show the contents of the PSW Register after the execution of the following instructions.

(i) MOV A, #0BFH
ADD A, #1BH

(ii) MOV A, #250
ADD A, #50

(06 Marks)

c. Explain the Pin diagram of 8051 microcontroller with a neat diagram. **(08 Marks)**

OR

2 a. Compare the RISC and CISC architectures. **(04 Marks)**

b. Identify the addressing modes of the following instructions:

(i) MOV DPTR #ABCDH
(ii) CJNE A, 40H, NEXT
(iii) PUSH 30H
(iv) XRL A, @R_0
(v) MOVC A, @A + DPTR
(vi) DJNZ 30H, LOOP

(06 Marks)

c. Design an memory interface to connect 4 KB ROM memory using 74LS138 decoder with address space 4000H – 4FFFH. **(10 Marks)**

Module-2

3 a. Explain the following instructions:

(i) SUBB A, 30H
(ii) CJNE A, 30H, BACK
(iii) RRL A
(iv) XRL A, #78H

(08 Marks)

b. Find the delay in the following program for a 8051 system with crystal frequency of 22MHz

```
DELAY :  MOV R2 , #19
         MOV R3 , #255
AGAIN :  DJNZ R3 , AGAIN
         DJNZ R2 , HERE
         RET
```

(04 Marks)

c. Write a program to find the SUM of 5 BCD numbers stored in RAM locations starting at 40H and the Result must be in BCD. **(08 Marks)**

OR

4 a. Write sequence of events that occur in 8051 microcontroller when the CALL and RET instructions are executed? **(06 Marks)**

b. Write a program to add two 32-bit numbers stored in RAM locations 40H and 50H respectively and result must be stored from 60H location. **(08 Marks)**

c. Write a program to check the status of SW connected to Pin $P_{1.7}$ perform the following:

(i) If SW = 0, send letter "N" to P_2
(ii) If SW = 1, send letter "Y" to P_2

(06 Marks)

Module-3

5 a. Explain C data types for 8051 with data size in bits and data range. **(06 Marks)**

b. Write an 8051 C program to get a byte of data from P_0, if it is less than 100 send it to P_1 otherwise send it to P_2. **(06 Marks)**

c. Write a program to generate a square wave on Pin 3.4 with ON time 4 msec and OFF time 3 msec using timer 0, mode 0 with crystal frequency of 22 MHz. **(08 Marks)**

OR

6 a. What are the different ways to create time delay in C? Discuss the factors affecting the accuracy of the time delay. **(06 Marks)**

b. Write an 8051 C program to toggle all bits of port P_0 continuously use timer 0 to generate delay at 1 sec between each toggle. **(06 Marks)**

c. Write a C program to send out the value 44H serially bit at a time via $P_{1.0}$. The LSB should go out first. **(08 Marks)**

Module-4

7 a. Explain asynchronous serial communication format. **(04 Marks)**

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

c. Write an 8051 C program to send two different strings to the serial port. A switch SW is connected to Pin 2.0 monitor its status and
If SW = 0 ; send your first name
If SW = 1 ; send your last name
Assume XTAL = 11.0592 MHz, baud rate of 9600 8-bit data, 1 stop bit continuously. **(10 Marks)**

OR

8 a. Compare Interrupts and Polling. List the various interrupts of the 8051 with their vector address. **(06 Marks)**

b. Explain how to double the baud rate in the 8051. **(04 Marks)**

c. Write a program to generate two square waves one on $P_{1.3}$ of 5 KHz frequency and another on Pin $P_{2.3}$ of frequency 25 KHz with XTAL 22 MHz. **(10 Marks)**

Module-5

9 a. Explain 8255 control word format for BSR and I/O modes **(10 Marks)**

b. A switch is connected to Pin $P_{2.3}$. Write C program to monitor the status of SW and perform the following :
(i) If SW = 0 ; the stepper motor moves clockwise
(ii) If SW = 1 ; the stepper motor moves counter clockwise **(10 Marks)**

OR

10 a. Draw and explain the steps to interface ADC 0808 to the 8051 microcontroller. **(10 Marks)**

b. Write an 8051 C program to display "HELLO" on the LCD connected to 8051. **(10 Marks)**

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