CBCS SCHEME

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18EC46

Fourth Semester B.E. Degree Examination, Jan./Feb. 2021
Microcontroller

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Write the block diagram of a Microprocessor and a Microcontroller. Differentiate between them. **(06 Marks)**

b. Explain the internal RAM and ROM organization and SFR of 8051 Microcontroller. **(08 Marks)**

c. With a neat sketch, explain the input, output operations of port 0 in configuration in 8051. **(06 Marks)**

OR

2 a. List and explain the criteria for the choice of microcontroller. **(04 Marks)**

b. With necessary sketches, explain i) Flags and Program status word ii) Stack operation. **(10 Marks)**

c. Explain the timing associated with external memory. **(06 Marks)**

Module-2

3 a. With the block diagram, explain the instructions used for accessing external memory RAM and specify its range of address. **(08 Marks)**

b. Write an assembly language program to swap the contents of registers R_7 and R_6 in register bank 0 using i) direct address mode moves ii) using PUSHes and POPS iii) using XCHes. Specify the total bytes used in each case. **(06 Marks)**

c. List bit level logical instruction and explain them. Specify their range of address for these instructions. **(06 Marks)**

OR

4 a. Identify the addressing mode for the following instructions. Explain the instructions and their addressing mode i) MOVC A, @ A+DPTR ii) MUL AB iii) MOV B, #OFFh iv) SUBB A, 45h. **(12 Marks)**

b. The number A6h is placed in external RAM between locations 0100h and 0200h. Write an assembly language program to find the address of that location and place that address in R_6 and R_7. **(04 Marks)**

c. Explain different ranges for jump instruction available in 8051 microcontroller. **(04 Marks)**

Module-3

5 a. Show the stack contents, SP contents and Contents of register affected after each step of the following sequence of operations

```
MOV SP, # 70h
MOV R5 , # 30h
MOV A, # 44h
ADD A, R5
MOV R4, A
PUSH 4
PUSH 5
POP 4.
```

(08 Marks)

b. Differentiate between CALL and JUMP. Explain the types of CALLS and specify their ranges. **(06 Marks)**

c. A switch is connected to pin 1.1. Write a flow chart and assembly language program to check the status of SW and perform the following operation.
i) if SW = 0, decimal up counter ii) if SW = 1, decimal down counter.
Display the count on port 2 using delay subroutine. (with 100μs delay and crystal frequency of 12MHz). **(06 Marks)**

OR

6 a. Explain with diagram, the sequence of events for storing and retrieving the Return Addresses on stack. **(06 Marks)**

b. Write a assembly language program to blink all the LEDS connected to port P1 at ½ second. Assume crystal is 22MHz. Show all the calculations necessary. **(06 Marks)**

c. Write an assembly language program to reverse the contents of array of size 10, stored in internal RAM and store the reversed array in the same location. Show the result and write comments. **(08 Marks)**

Module-4

7 a. Write the block diagram to show Mode 2 operation of timer 1, as a counter and also write the programming steps to program timer 1 on Mode 2. **(06 Marks)**

b. Assume XTAL = 22MHz. Use Timer 1 in Mode 1. Write a AL program to generate a pulse train of 2 seconds period on P2.4. **(07 Marks)**

c. Explain i) Half and full – duplex transmission ii) Serial control register. **(07 Marks)**

OR

8 a. Explain TMOD register of 8051 microcontroller. **(06 Marks)**

b. Explain the importance of T1 flag and R1 flag. **(08 Marks)**

c. Write a C program for 8051 to transfer letter "A" serially at 4800 baud continuously. Use 8 – bit data and 1 stop bit. **(06 Marks)**

Module-5

9 a. Explain the following : i) interrupt ii) ISR iii) IVT.
List the types of interrupts and their location. **(07 Marks)**

b. Write the instructions to :
i) enable the serial , interrupt, Timer 0 interrupt and external hardware interrupt 1
ii) disable the Timer 0 interrupt.
iii) disable all interrupts with a single instruction.
Use bit manipulation instructions for all the cases. **(03 Marks)**

c. Explain with neat diagram, interfacing of LCD to 8051μc. Write an assembly language program to display EC46 on LCD. **(10 Marks)**

OR

10 a. Assume XTAL = 11.0592 MHz. Use timer 0 to create the square wave. Write a C program that continuously gets a single bit of data from P1.7 and sends it to P1.0, while simultaneously creating square wave of 200μs period on P2.5. **(05 Marks)**

b. Explain the TCON register. **(05 Marks)**

c. Explain the pins of ADC0804 and give its pin diagram. Write an assembly language program to rotate stepper motor in clockwise and anti clockwise directions for 5 rotations. **(10 Marks)**

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