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10ES42

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

Time: 3 hrs. Max. Marks:100

Note:1. ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. ***Missing data if any, may be assumed suitably.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – A

1 a. Differentiate between Microprocessor and Microcontroller. **(06 Marks)**

b. Write the block diagram of 8051 Microcontroller and list the features of it. **(10 Marks)**

c. Write a neat schematic to interface 4 K RAM to 8051. Also write the address range. **(04 Marks)**

2 a. Write assembly programs to add two eight bit numbers in three different addressing modes operands stored at 20 h and 21h. Store sum and carry at 22h and 23h. **(06 Marks)**

b. Differentiate between following instructions , explaining their functions :
i) SWAP and XCHD ii) ADD and ADDC
iii) DJNZ and JNZ iv) Bit level CPL and byte level CPL. **(06 Marks)**

c. Discuss the different ranges of JUMP and CALL instructions in 8051? Differentiate between JUMP and CALL instructions. **(08 Marks)**

3 a. Discuss assembler directives. Explain 8051 directives with examples. **(07 Marks)**

b. An 8 – bit data is stored at location 20h. Write Assembly program to
i) Double the number and store the result at 21h and 22h, lower byte and higher byte respectively. Do not use Arithmetic Instruction.
ii) Check MSB of the number. If it is positive, find its 2's complement, using subroutine and store the result in 23h. **(08 Marks)**

c. Calculate the time delay in the following subroutine.
Assume XTAL frequency = 11.0592 MHz.

```
        MOV R2, # 200.
again : MOV R3, # 250.
back  : NOP
        NOP
        DJNZ R3, back
        DJNZ R2, again
        RET.
```

(05 Marks)

4 a. With diagram, explain the operation of Port 1 of 8051. Explain the function of Port 3. **(10 Marks)**

b. Interface a stepper motor using Port 2 and a switch, using P1.2. Write Assembly program to rotate stepper motor in clockwise and anti clockwise direction, based on bit status of P1.2. **(10 Marks)**

PART – B

5 a. Discuss the concepts of Interrupt. Give the
i) Interrupt structure of 8051 ii) IE Register format and the function of each bit **(08 Marks)**

b. Differentiate between Timer and Counter. What are the different modes of operation of timers in 8051? **(06 Marks)**

c. Write ALP to generate a square wave of frequency 2 KHz, using timer 0 in mode 1. Assume XTAL frequency = 11.0592 MHz. **(06 Marks)**

6 a. Discuss the advantages of Serial Communication. How it is achieved in 8051 using RS 232? **(06 Marks)**

b. Discuss the functions of SCON and SBUF Registers. Write the bit pattern and the function of each bit of SCON register. **(06 Marks)**

c. Write 8051 C program to send two different strings to serial port. Assuming that SW is connected to pin P2.0, monitor its status and make decision as follows :
SW = 0 ; Send first string.
SW = 1 ; Send second string.
Assume XTAL = 11.0592 MHz , Baud rate = 9600 , 8 bit data, 1 stop bit. **(08 Marks)**

7 a. List the features of MSp 430 processor , that makes it suitable for low power application. **(06 Marks)**

b. Explain the Registers available in MSp 430. **(08 Marks)**

c. Give the addressing modes in MSp 430, with examples. **(06 Marks)**

8 Write short notes on :

a. Clock system of MSp 430.
b. Watch Dog Timer in MSp 430.
c. Bit Manipulation Instructions in 8051.
d. Stack operations in 8051. **(20 Marks)**

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