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10ES42

Fourth Semester B.E. Degree Examination, June/July 2019
Microcontrollers

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Give the comparison between microprocessor and microcontroller. **(06 Marks)**

b. Explain the following with respect to 8051: (i) PSW (ii) Stack and SP. **(08 Marks)**

c. Interface external ROM of 16 K and RAM of 2 K to 8051. Derive the address range for both memories. **(06 Marks)**

2 a. Using immediate, Register, Direct and Register indirect addressing modes, copy the value 1Fh to RAM locations 70H to 73H. **(08 Marks)**

b. Write and explain the instruction to perform each of the following operation:
(i) To read a byte from code memory.
(ii) To double an 8 bit number in accumulator.
(iii) To copy the carry bit to LSB of Register A.
(iv) To exchange data bytes of Accumulator and internal RAM location. **(06 Marks)**

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

3 a. Write program to add two 16-bit numbers in internal RAM. Store the lower byte, higher byte of result and the carry in registers R5, R6 and R7 respectively. **(08 Marks)**

b. Briefly explain the four assembler directives used in 8051, with examples. **(06 Marks)**

c. Find the time delay for the following subroutine, if the crystal frequency is,
(i) 12 MHz
(ii) 11.0592 MHz

```
Delay : MOV R2, #250
loop : NOP
       NOP
       NOP
       NOP
       DJNZ R2, loop
       RET
```

(06 Marks)

4 a. With diagram, explain briefly the operation of Port 1 of 8051. **(04 Marks)**

b. Interface 4×4 key-board to 8051 and write algorithm to identify the key pressed. **(08 Marks)**

c. Write ALP to interface stepper motor to 8051 and rotate clockwise 80°, with step angle of 2 degrees. **(08 Marks)**

PART – B

5 a. Explain interrupt system of 8051. How interrupt system is enabled? **(06 Marks)**

b. Write ALP to generate a square – wave of 2 kHz, with 50% duty cycle, on p2.5, assuming XTAL = 11.0592 MHz. Show the necessary calculations. Use timer 0 in model. How to generate a square wave of 66% duty cycle? **(08 Marks)**

c. What are different modes of operation of timer/counter? How will you differentiate between timer and counter? **(06 Marks)**

6 a. Explain briefly RS232 standard. How do you connect RS232 to 8051? **(06 Marks)**

b. Write program to send the message "GOODLUCK" to serial port at 9600 baud, 8 bit data and 1 stop bit. Briefly explain the importance of TI flag. **(08 Marks)**

c. Write the control word Register of 8255A and explain. **(06 Marks)**

7 a. Explain the different Registers in MSP430. **(10 Marks)**

b. List and briefly explain arithmetic and logic instructions (with 2 operands) in MSP430. **(10 Marks)**

8 a. Give the interfacing circuit of LCD to 8051 and write a ALP to send E and C to LCD using delays. **(08 Marks)**

b. Explain briefly, the jump ranges in 8051. **(06 Marks)**

c. Write 8051 ALP to convert an 8-bit BCD number to equivalent ASCII. **(06 Marks)**

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