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10ES42

Fourth Semester B.E. Degree Examination, December 2012

Microcontrollers

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Mention the difference between RISC and CISC processor. **(06 Marks)**

b. Explain function of following pins of 8051:
   i) $\overline{EA}$
   ii) ALE
   iii) $\overline{PSEN}$
   iv) RST **(08 Marks)**

c. Explain the internal memory organization of 8051. **(06 Marks)**

2 a. With necessary examples, explain immediate, bit direct and indexed addressing mode of 8051. **(06 Marks)**

b. Explain the effect of following instructions:
   i) MOVX A, @dptr
   ii) DJNZ R3, next
   iii) DA A
   iv) LJMP label **(08 Marks)**

c. Write a program segment to realize following:
   i) Exchange contents of external data memory 8100 h with contents of internal data memory 40 h.
   ii) Exchange contents of A-register and B-register using stack. **(06 Marks)**

3 a. What do you understand by assembler directives? Explain the following assembler directives:
   i) ORG ii) END iii) EQU **(08 Marks)**

b. Write an ALP to convert a 2-digit BCD number to binary. **(06 Marks)**

c. Write a delay program to generate a delay of 10 ms. Assume a crystal of 11.0592 MHz. Show delay calculation clearly. **(06 Marks)**

4 a. Explain the usage of the port pins of 8051. **(06 Marks)**

b. With necessary interface diagram, write a C program to generate a triangular wave using DAC interface. **(06 Marks)**

c. With necessary interface diagram, write a program to display "VTU2012" on a LCD interface. **(08 Marks)**

PART – B

5 a. Mention the difference between counter mode and timer mode of operation. With necessary format, explain the various bits of TMOD-SFR. **(06 Marks)**

b. Write an 8051 C program to generate a square wave of 2 kHz using timer 1, mode 2. Show the calculations clearly. Assume a crystal frequency of 11.0592 MHz. **(08 Marks)**

c. Explain the interrupts of 8051 clearly mentioning the vector address and priorities. **(06 Marks)**

6 a. Explain the various modes of serial communication operation. **(06 Marks)**

b. Write a program to transmit a message "VTU" serially at a band rate of 9600. Take crystal frequency as 11.0592 MHz. **(08 Marks)**

c. Explain with a neat diagram, the functional block diagram of 8255. **(06 Marks)**

7 a. With necessary block diagram, explain the architecture of MSP 430. **(08 Marks)**

b. Explain clock system of MSP 430. **(08 Marks)**

c. Explain the use of registers P_XDIR and P_XOUT. **(04 Marks)**

8 a. Explain various low power operating modes of MSP 430. **(10 Marks)**

b. Explain the bits of TCON register. Write an 8051 C program to toggle only bit P1.5 continuously every 50 msec. Use timer 1 to generate the delay. Assume XTAL = 11.0592 MHz. **(10 Marks)**

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