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06ES42

Fourth Semester B.E. Degree Examination, June/July 2011
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. Compare the following :
   i) Microprocessors and Microcontrollers
   ii) RISC and CISC architectures
   iii) Harvard and Von-Neumann architecture. **(12 Marks)**

   b. Explain the following pins and its functions of 8051 microcontrollers:
   i) ALE ii) $\overline{PSEN}$ iii) $\overline{EA}$ iv) $\overline{RD}$ **(08 Marks)**

2 a. Explain the addressing modes of 8051 with examples. **(08 Marks)**

   b. Explain the following instructions of 8051 with examples for each instruction:
   i) SUBB A, direct ii) PUSH direct iii) MOVE A, @A+DPTR **(06 Marks)**

   c. Examine the following code and analyse the result with flag register content:
   MOV A, # +96
   MOV R_1, # +70
   ADD A, R_1 **(06 Marks)**

3 a. Classify the CALL instruction in 8051. Explain each one. **(06 Marks)**

   b. What are the steps executed by the 8051 microcontroller when the following instructions is executed:
   i) RET ii) AJMP addr11 **(06 Marks)**

   c. Write an ALP to add 'N' 8-bit numbers available from memory location START. Display the result at port 0 and port 1. **(08 Marks)**

4 a. Explain different data types in 8051 C. **(04 Marks)**

   b. Write an 8051 C program to get a byte of data from P_1, wait ½ second and then send it to P_2. **(08 Marks)**

   c. Write an 8051 C program to convert ASCII digits of any two values to packed BCD and display it on port 1. **(08 Marks)**

PART – B

5 a. Explain TMOD and TCON SFR registers of 8051 timers. **(08 Marks)**

   b. Write an ALP or C program to generate a frequency of 100 Hz square wave, using timer 0 in mode 1. Assume crystal frequency = 11.0592 MHz. **(12 Marks)**

6 a. What is baud rate? Which timer of the 8051 is used to set the baud rate? **(03 Marks)**

   b. Explain SCON register with its bit pattern. **(07 Marks)**

   c. Write an 8051 program to send the date message "MORNING" of length seven characters at a baud rate of 4800, b-bit data, 1 stop bit serially. **(10 Marks)**

7 a. Compare polling interrupts. What are the steps microcontroller perform upon activation of an interrupt. **(06 Marks)**

b. How the interrupts in 8051 is classified? Explain each interrupt. **(06 Marks)**

c. Write a program using interrupts to get data from P_1 and send it to P_2 while Timer 1 is turning ON and OFF the LED connected to $P_{0.4}$ every second. **(08 Marks)**

8 a. Interface ADC 0804 to 8051 and write a program to read analog data and display the converted data at port 2. **(10 Marks)**

b. Show the interfacing of a stepper motor to 8051 and write a program to rotate stepper motor 5 steps in clockwise direction and 10 steps in anticlockwise direction with a delay between each step. **(10 Marks)**

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