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06ES42

Fourth Semester B.E. Degree Examination, June/July 08
Microcontrollers

Time: 3 hrs. Max. Marks:100

Note : ***Answer any FIVE questions choosing at least TWO from each part.***

Part – A

1 a. Explain the differences between the following :
i) RISC and CISC processors ii) Harvard and Von-Neumann architectures. **(08 Marks)**

b. With the help of timing diagram, explain how to interface 8K EPROM and 4K RAM to 8051 microcontroller. **(07 Marks)**

c. Explain TCON and TMOD registers of 8051, with the help of timer/counter control logic. **(05 Marks)**

2 a. Write a program to put the number 34h in registers R4, R5, R6 and R7 using different addressing modes. **(06 Marks)**

b. Explain the operation performed by the following instructions :
i) SWAP A ii) MOV c,.b iii) DA A iv) SUBB A, Sr **(06 Marks)**

c. Write a program to swap the contents of registers R7 and R6 in register block 0, in four different ways. **(08 Marks)**

3 a. Explain different ranges for jmp instruction available in 8051 microcontroller. **(08 Marks)**

b. Explain with a neat diagram, the significance of stack memory, whenever a CALL instruction is executed by the 8051 microcontroller. **(05 Marks)**

c. Write a program to find the address of the first two internal RAM locations between 20h to 60 h, which contains consecutive numbers. If so, set the carry flag to 1 else clear the flag, using a subroutine. **(07 Marks)**

4 a. Write an 8051 C program to toggle all the bits of P1, P2 and P0 continuously with a 250 ms delay. Use sfr keyword to declare the port addresses. **(06 Marks)**

b. Explain with an example, bit-wise logic operators for 8051 C. **(06 Marks)**

c. A switch (SW) is connected to P2.0 port pin. Write a C program to send out the value 44H serially one bit at a time via P1.0, depending upon the switch condition : When SW = 0 ; LSB should go out first, When SW = 1 ; MSB should go out first **(08 Marks)**

Part – B

5 a. Explain the steps to program timers in mode1 and write an 8051 program to generate a square wave of 50% duty cycle on the pin P1.5 **(06 Marks)**

b. Assume that a 1 Hz frequency pulse is connected to input pin P3.4. Write an 8051 program to display counter 1 on an LCD. Set the initial value to get one minute delay. **(06 Marks)**

c. A switch is connected to the pin P1.2. Write an 8051 C program to monitor the switch and create the following frequencies on pin P1.7
i) When SW = 0 ; 500 Hz ii) When SW = 1 ; 750 Hz
Use timer 0, mode 1 for both of them. **(08 Marks)**

6 a. List the advantages of serial communication over parallel communication. **(06 Marks)**

b. Write an 8051 program to send the message "The Earth is beautiful", to the serial port continuously. Assume XTAL = 11.0592 MHz, 9600 baud rate, 8-bit data and one stop bit. **(08 Marks)**

c. Write an 8051 program to send the text string "Good Luck" to serial #1 of the DS 89C4XO. Set the band rate at 9600, 8 bit data and 1 stop bit. **(06 Marks)**

7 a. What are edge triggered interrupts? How to set INT0 as level triggered interrupt and INT1 as edge triggered interrupt, explain with the help of SFR related to it. **(08 Marks)**

b. Write an 8051 C program using interrupts to do the following :
i) Receive the data serially and send it to P0 ii) Read port P1 transmit data serially and give a copy to P2 iii) Make To to generate a square wave of 5 kHz frequency on P0.1. Assume that XTAL = 11.0592 MHz, set the baud rate at 4800. **(12 Marks)**

8 a. Draw the block schematic of DAC 0808 interfaced to 8051 at port P_1 and write an 8051 program to generate sine wave. **(10 Marks)**

b. How to interface DC motor to 8051 microcontroller using opto isolator? Write a C Program to move DC motor with 25% duty cycle pulse. **(10 Marks)**