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Fourth Semester B.E. Degree Examination, Dec.09/Jan.10

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. What is a microcontroller? With a neat block diagram explain, Harvard architecture. Distinguish between i) microcontroller and microprocessor, and ii) Harvard architecture and Von Neumon's architecture. (10 Marks)
- b. With a neat block diagram, explain the function of each block of 8051 microcontroller architecture. (10 Marks)
- 2 a. Mention the addressing modes of 8051 microcontroller. Explain each of them with an example for each. (08 Marks)
- b. Correct the following instructions, if found to have any wrong syntax. Explain the operation of corrected instructions.
i) MOV #C,OA ii) MOV A,RS1 iii) MOV A,@R7 iv) MOV 0346H,@RO
v) XCHG B,@R3. (05 Marks)
- c. Show the stack contents, SP contents & contents of any register affected after each step of the following sequence of operations.
MOV SP,#70H
MOV R5,#30H
MOV A,#44H
ADD A,R5
MOV R4,A
PUSH 4
PUSH 5
POP 4. (07 Marks)
- 3 a. With the relevant figure, write a sequence of events that occur in 8051 microcontroller when the CALL and RET instructions are executed. (06 Marks)
- b. Write an ALP in 8051 to find the largest number among the 12, 8 bit numbers stored in the internal RAM. (07 Marks)
- c. Write an ALP in 8051 to perform the following operation:
 $Z=(X1+Y1)*(X2+Y2)$ where, X1, X2, Y1 and Y2 are the 8 bit hexadecimal numbers stored in the RAM locations. Write a subroutine for the addition and assume that each addition result with 8 bit number. (07 Marks)
- 4 a. Discuss the data types in 8051 C. (06 Marks)
- b. What are the ways to create time delay? Discuss the factors affecting the accuracy of the time delay. Write a function in C to create a time delay. (08 Marks)
- c. Write a C program in 8051 to convert packed BCD Ox39 to ASCII and display the bytes on p1 and p2. (06 Marks)

PART – B

- 5 a. What is the difference between timer and counter? Explain the function of each bit in the TMOD. (04 Marks)
- b. Write an ALP to generate square wave on pin P1.5 of 500 Hz (approximately) with a subroutine to provide a time delay of 30.38 μ s using timer 0. Assume that crystal frequency of 8051 is 11.0592Hz. (10 Marks)
- c. In what way timer/counter mode2 programming is different from mode 0 and mode 1? (06 Marks)

- 6 a. Explain full duplex, half duplex and simplex serial data transfer. (06 Marks)
b. Write the steps required for programming 8051 to transfer data serially. (08 Marks)
c. Write a C program for the 8051 to transfer the letter "C" serially at 9600 baud continuously. Use 8 bit data and 1 stop bit. (06 Marks)
- 7 a. What are Interrupts and Interrupt Subroutines? Explain the interrupts that are present in 8051. (06 Marks)
b. Discuss what happens if interrupts INTO, INT1 and TF1 are activated at the same time. Assume priority levels set by the power up reset. Program the IP register to assign the highest priority to INT1 and then discuss what happens if INTO, INT1 and TF1 are activated at the same time. Assume that external hardware interrupts are edge triggered. (06 Marks)
c. What is a level triggered interrupt? How to get the edge triggered interrupt? Explain the procedure to sample the low level triggered interrupt and edge triggered interrupt. (08 Marks)
- 8 a. Explain, with a block diagram step by step procedure involved to interface 4x4 matrix keyboard with 8051. (10 Marks)
b. Discuss interfacing of ADC0804 with 8051 using timing diagram for ADC. (10 Marks)

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ERROR: stackunderflow
OFFENDING COMMAND: ~

STACK: