Question Paper

Exam Date & Time: 22-Nov-2018 (02:00 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
THIRD SEMISTER B Sc.EXAMINATION NOV 2018
MICROCONTROLLERS [IEE 234 - S2]

Marks: 100 **Duration: 180 mins.**

Answer 5 out of 8 questions.
Missing data if any may be suitably assumed

1) How is RAM organized in 8051? List and explain with suitable examples the different instructions that can be used for accessing the following memory. (10)
On chip RAM
On chip ROM
Off chip data memory
Off chip program memory

1A)

1B) What is meant by stack? How to access data in a stack? What is the default location of a Stack in 8051? Describe with an example the instructions of 8051 in which stack is used internally by 8051. (10)

2) With a neat sketch explain the architecture of 8051 microcontroller. Describe the functions of any four pins of 8051 microcontroller used while accessing external memory. (10)

2A)

2B) Write the 8051 program to add the contents of memory locations 80H and 81H. Store the result in external RAM location 9000H. Verify PSW register content and comment. Use immediate addressing to load the values to 80H and 81H. (10)

3) Write an ALP to sort the array of five numbers in the ascending order starting at location 50H. (10)

3A)

3B) Write an 8051 ALP to compare two numbers at 50H and 51H. If num1 > num2, store F0H, or if num1 < num2, store 0FH or if num1 = num2 store FFH at location 53H. (10)

4) (10)

4A) Explain the sequence of operations that takes place, when the CPU of 8051 is interrupted, assuming the interrupt to be enabled. List the vector addresses for all the six interrupts of 8051.

4B) Write an ALP to display a hex decimal down counter starting at 25H- 10H continuously on port 0 with a delay of 0.1ms. Use Timer 0 in mode 2 to obtain the required delay. Assume XTAL =11.0592MHz (10)

5) 5A) I) Calculate the value to be loaded to TH1 register to get a baud rate of 2400, with XTAL=11.0592MHz. (10)
II) Write 8051 instruction/s to double the baud rate while using serial port in mode 1.
III) Write 8051 instruction/s to program SCON register to transfer and receive data serially. Use serial port in mode 1.
IV) Explain the need for data converters
V) How do you improve the resolution of ADC

5B) Write a ALP to toggle P1 a total of 100 times with a delay of 0.5ms. Use RAM location 32H to hold your counter value instead of registers R0 -R7. Use Timer 1 in mode 1 with XTAL frequency = 11.0592MHz (10)

6) 6A) Write an ALP to generate a cycle of pulse wave with ON time 3ms and 10ms OFF time on P0.5 when external interrupt 0 is pressed on switch P2.1. Assume XTAL frequency =11.0592MHz. Use timer 1 in mode 2 (10)

6B) Interface ADC 0808/0809 to 8051 and write an 8051 ALP to obtain digital output at port 2 of 8051, taking input from channel 2. Show the interfacing circuit. Use P1.2, P1.1, P1.0 for channel selection, P1.3 for Output Enable, P1.5 for Address Latch Enable, P1.6 for Start Of Conversion and P1.7 for End Of Conversion. Take Vref+ = 5 V and Vref- = '0' V (10)

7) 7A) Interface a 4*4 matrix key board containing for numbers '0' to '9' and 'A' to 'F' to port 1 and port 2 of 8051. Port 2 is configured as input port. Show the connection diagram. Write an 8051 program to scan keys, detect key closure, identify key closure and display the key pressed at external location 8051H. (10)

7B) Interface a 16x2 LCD to 8051 and write an 8051 ALP to (10)

display ENDSEMEXAM in line '2' starting at position '3'. Assume P1 is connected to D0-D7, P2.0 to RS pin, P2.1 to R/W pin, P2.2 E pin

8) Write a C program that continuously gets a single bit from P1.7 and sends it to P1.0, while simultaneously generating a square wave of 200us period on pin P2.5. Use timer 0 mode 2 with XTAL =11.0592MHz. (10)

8A)

8B) Write an 8051 program to generate sinusoidal waveform on P1 for the equation below (10)
Vout = 5V+5sinθ

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