Question Paper

Exam Date & Time: 22-Nov-2019 (02:00 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
END SEMESTER THEORY EXAMINATIONS NOVEMBER 2019
III SEMESTER B.sc. (Applied Sciences) in Engg.
MICROCONTROLLERS [IEE 234]

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

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

1)		With the help of a neat sketch explain the architecture of 8051 microcontroller	(6)
	A)		
	B)	Explain the function of following registers of 8051 microcontroller. i) PC ii) DPTR iii) SBUF	(6)
	C)	Describe the following and compare their merits and demerits, i) Princeton(von-Neumann) and Harvard architecture ii) RISC and CIS processor	(8)
2)		Describe the different addressing modes supported by 8051 and explain with a suitable example.	(10)
	A)		
	B)	Set of 10 data bytes are stored in successive locations starting from 50H.Write an ALP to check each data byte and save the bytes that are higher than the 60 and lower than the 100 in the location starting from 61H and count of such numbers in 60H.	(6)
	C)	Write a brief note on PSW register and SFRs of 8051.	(4)
3)		What happens when 8051 is reset? With the help of a relevant circuit diagram explain the power on reset operation for 8051 micro controller	(8)
	A)		
	B)	Write an ALP such that if all the bits in lower nibble of the value stored in 40H are high (lower nibble =1111) then store FFH in 41H, else store 00H in 41H; if all the bits in upper nibble are low (upper nibble=0000) store FFH in 42H else store 00H in 42H.	(6)
	C)	Discuss in detail the steps involved while executing the following instructions and illustrate the same with a suitable example. i) LCALL ii) ADDC A, source byte.	(6)

4)	A)	An unsigned non zero 8bit number is stored in accumulator. Write an 8051 ALP to check whether this number is available in an array of 15 bytes stored in external RAM location starting from 1000H. If the number is available, store the number in R2 register, number of times it is available is in R1 register and the address of the location corresponding to first match at R3 & R4 registers. If the number is not available store 00H in R2, R3 & R4 registers.	(8)
	B)	Answer the following with respect to timer of 8051 i) Differentiate clearly the salient feature of mode1 and mode2 operations ii) Differentiate between the operation in timer mode and counter mode iii) Write an 8051 instruction to configure timer 1 in mode 0 with internal clock, iv) software control to start and stop.Write an 8051 instruction to configure timer 1 as a counter in mode 2 with external clock, hardware control to start and stop.	(8)

	C)	Determine the content of accumulator and flags after the execution of following 8051 ALP code.
		CLR C
		MOV A,#62H
		SUBB A, #96H
		MOV R7,A
		MOVA,#27H
		SUBB A,#12H
		MOV R6,A
			(4)

5)	A)	Write an 8051 ALP to receive 10bytes of data serially through RXD pin of 8051 at 9600 baud rate. After receiving all 10 data bytes transmit them serially via TXD pin at 19200 baud rate. Assume XATL=11.0592MHz.	(15)
	B)	Explain the details of PSW register of 8051. What is the significance of overflow flag in signed number arithmetic operation	(5)
6)	A)	Show the complete interfacing circuit to interfacing a 4X4 hexadecimal matrix key board to 8051. Use port pins P0.0 to P0.3 as rows and P1.0 to P1.3 as columns. Write an 8051 ALP to detect the key press and send the ASCII code of the key pressed at port2. Use software debouncing techniques.	(15)
	B)	Explain the necessity of the following development tools for 8051 based product development i) Simulator ii) Linkers iii) Assembler and Complier	(5)
7)	A)	Write an 8051 C program to toggle all the bits of port 1 with a delay of 1.85 seconds between. Use timer 1 in mode 1 to obtain the required delay and write a separate function for delay program	(8)
	B)	Interface the following memory device to 8051.show the complete interfacing circuit. Avoid fold back space.	(8)

1KX8 RAM as data memory with starting address 8000H
2KX8 EPROM as program memory(code memory) with starting address 5000H

C) Give the details of input output (I/O) and bit set reset (BSR) control words of 8255 PPI. (4)

8) Write an 8051 ALP for a decimal up counter starting from 00 to 99 and send the count to port1 with a delay of 1.3s. use timer1 in mode1 to obtain the required delay. Assume XATL=11.0592MHz. (10)

A)

B) Show the interfacing circuit to interface a 4 coil 45 rotor teeth stepper motor to 8051 micro controller. Write an ALP to rotate the motor once through 120^0 in counter clockwise direction? Use 8 step pulse sequence (10)

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