Question Paper

Exam Date & Time: 03-May-2024 (02:30 PM - 05:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

FOURTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, MAY 2024

MICROCONTROLLERS [ICE 2222]

Marks: 50 **Duration: 180 mins.**

A

Answer all the questions.

Instructions to Candidates: Missing data may be suitably assumed

1)		Illustrate interfacing of LCD to 8051 microcontrollers. [CO5, PO1,2,3,4,5,12, BL3]	(2)
	A)		

	B)	Write a note on the flag bits of 8051. Calculate the status of CY, AC and P flags after the following instructions : [CO1, PO 1,2,3,5, BL3]
		MOV A, #9CH
		ADD A, #64H
			(3)

	C)	Multiply 11 by 5 using the technique of repeated addition. Load the resulting value into the accumulator and complement the accumulator 800 times. [CO2, PO1,2,3,5, BL3]	(5)
2)		With examples, illustrate the differences between interrupt and polling mechanism as relevant to microcontrollers. [CO3, PO1,2,3,5, BL3]	(2)
	A)		
	B)	Classify the exception groups in ARM processors. Illustrate the exception entry and exception exit steps with suitable examples. [CO4, PO1,2,3,4,12, BL3]	(3)
	C)	Generate two square waves - one of 5KHz frequency at Pin 1.3 and another of frequency of 25 KHz at Pin 2.3. Assume XTAL = 22MHz. [CO3, PO1,2,3,5, BL3]	(5)
3)		Two switches are connected to Pin 3.2 and Pin 3.3. When a switch is pressed, the corresponding line goes low. Write a program to: [CO3, PO1,2,3,5, BL3]	(2)
	A)	(a) light all the LEDs connected to Port 0, if the first switch is pressed (b) light all the LEDs connected to Port 2, if the second switch is pressed	
	B)	Assess the use of timer 0 of 8051 microcontroller in mode 2 to generate a square wave of frequency 72 Hz on Pin 1.1. Assume XTAL = 11.0592 MHz. [CO3, PO1,2,3,12, BL3]	(3)
	C)	Analyse the functions of PWM match registers in generating PWM outputs. Illustarte the generation of 3 single edge controlled PWMs using LPC2148. The period is 6 milliseconds and the pulse width of the PWM1 is 1 millisecond and PWM2 is 2 millisecond and PWM3 is 3 millisecond. [CO4, PO1,2,3,4,12, BL3]	(5)
4)		Draw the THUMB programmers' model of ARM processor and illustrate the significance of THUMB mode. [CO4, PO1,2,3,4,12, BL3]	(2)
	A)		
	B)	Develop an 8051 assembly language program to receive 8-bit data serially and send the recived data to Port 1. Use Timer 1 in mode 2 to set the baud rate at 9600 and 1 stop bit. [CO3, PO1,2,3,12, BL5]	(3)
	C)	Explain different types of stacks in ARM processors. Write an ALP for ARM to exchange the content of the registers R1-R3 and R5-R7 using empty ascending stack and illustrate the stack operations. [CO4, PO1,2,3,4,12, BL4]	(5)

5)		How is pin connect block and PINSEL registers of LPC2148 used to select the multiple functions? Demonstrate with suitable examples. [CO4, PO1,2,3,4,12, BL3]	(2)
	A)		
	B)	Justify the role of TC, PC and PR registers in controlling the resolution of LPC2148 timers. [CO4, PO1,2,3,4,12, BL3]	(3)
	C)	Explain the features of LPC2148 timers. Write a C program for LPC2148 to toggle the LEDs connected to the pins P0.16-P0.23 on pressing the PUSH button connected to pin P1.8 with a delay of 0.75 seconds. Use timer 0 to generate the delay with resolution of 1 ms. Assume that the system is connected with 40 MHz frequency. [CO4, PO1,2,3,4,12, BL4]	(5)

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