Question Paper

Exam Date & Time: 25-Jul-2022 (09:00 AM - 12:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

DEPARTMENT OF INFORMATION AND COMMUNICATION TECHOLOGY
VI SEMESTER B.TECH(COMPUTER AND COMMUNICATION ENGINEERING) MAKEUP EXAMINATIONS, JULY 2022

EMBEDDED SYSTEMS DESIGN [ICT 3271]

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

Answer all the questions.

Instructions to Candidates: Missing data may be suitably assumed

1)		Explain the following ARM instructions with an example for each	(5)
	A)	a. MLA b. SBCS c. LDM d.MOV e. EOR	
	B)	Assume that columns of a 4x4 keyboard are connected to P1.23 and P1.26, and rows to P2.10 and P2.13 respectively. Write an embedded C program to display the key code of the key pressed on LEDs connected to P1.0 -P1.3.	(3)
	C)	Differentiate a. Vectored and Non-vectored interrupts. b. Internal and External interrupts	(2)
2)		Assume that a switch is connected to both P2.10 and P2.11 and a LED to P0.4. Write an embedded C program using external interrupts (Function-01) to turn ON the LED whenever the switch is pressed and turn OFF the LED whenever the switch is released.	(5)
	A)		
	B)	Explain the following registers of Analog to Digital converter in LPC 1768. a. ADGDR b. ADCR c. ADINTEN	(3)
	C)	List the features of RISC family of controller.	(2)
3)		Write an embedded C program to display the difference between the analog inputs applied at AD0.4 (P1.30, Function-03) and AD0.5 (P1.31, Function-03) on the LCD.	(5)
	A)		
	B)	Explain various indexed addressing modes with an example for each.	(3)
	C)	Explain the role of a decoder in multiplexed 7-segment display	(2)
4)		Write an assembly language function to convert a 2-digit BCD number to hexadecimal. Write a program to convert a 4-digit BCD to hexadecimal using the above function.	(5)
	A)		

B) Explain various special function registers used in configuring GPIO interrupts. (3)

C) Write a program to generate a sqaure wave of frequency 2KHz on P0.5 with 60% duty cycle using timer 0. Assume PCLK=3MHz (2)

5) Write an embedded C program to implement 4:1 multiplexer (MUX) such that four inputs are connected to P0.0 to P0.3, two select lines are connected to P0.4 and P0.5 and output is connected to P0.6. (5)

A)

B) Assume the initial content of all the registers to be 0. What are the contents of the registers R2, R3, and R13 after the execution of the following error-free block of code? (3)

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LDR R0, =-12

LDR R1, =-19

LDR R13, =0X10000014

STMDB R13!, {R0,R1}

LDR R2, =-24

PUSH {R2}

LDM R13, {R3, R2}
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C) With the help of a neat diagram, explain how a stepper motor is interfaced to ARM LPC1768 controller (2)

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