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School of Computer Science & Engineering
B.Tech (H) Program

Internal Assessment - 2 - Set 2
Academic Year: 2023 - 24
Term: Jan to May 24
Semester 2 Sections: All (A - I)

Date: 06-05-2024 **Duration: 1 hour 30 min**
Course Code: CS1120
Course Name: Embedded Systems & Microcontroller
Max Marks: 20

Mobile Phones, Smart Watches or any other internet enabled devices are treated as malpractice.

Student Name: **USN:** **Section:**

Instructions:
All questions are compulsory. There are 4 questions of 5 marks each.
Total = 20 Marks

Sl. No.	Questions	Marks	BT	CO
1	a) Interpret the meaning of the digits "4" and "3" in the **RP 4320** nomenclature. What can you conclude from the values? b) Consider two, 8 - bit unsigned hexadecimal numbers 0xFFFF FFFF and 0x01. Perform ADD operation on them, and update the N,Z,C,V flags of APSR. c) What is the minimum number of assembly instructions needed to perform the following f = (g + h) - (i + j).	2+2+1 = 5	3	6
2	a) Identify the functionality of UART in RP2040? Also mention the number of UART modules in RP2040. b) Illustrate with a neat diagram, the full duplex communication of UART in RP2040. Explain the connection. c) Construct the data frame sequence for transmitting 0xE8 using UART. The start bit is 0 and stop bit is 10 following odd parity.	2+2+1 = 5	6	6

3	a) Consider the ARM assembly snippet given below:
	MOV R1, #0x45
	MOV R2, #0x35
	ADD R4, R1, R2
	STR R4, [R3]
	Value in R3= 0x1000
	
	Identify the meaning of each of the above instructions.
	Illustrate the final output in a byte addressable memory diagram with Big-Endian mode of storage.
	b) Illustrate with diagrams the following Stack Addressing modes in ARM..
	i) Descending & full
	ii) Descending & empty
		3+2 = 5	3	4

4	Examine the code snippet in C given below.
	int power_1(int a, int b)
	{
	if (a <= b)
	return a/2;
	else
	return a*2;
	}
	Write the complete program where:
	i. The C program should get the input from the user and call the assembly function.
	ii. The assembly function should be the equivalent of the power_1 function and the result should be returned back to the C program.
		5	4	4