Question Paper

Exam Date & Time: 12-Jun-2023 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
END SEMESTER THEORY EXAMINATION-MAY 2023
IV SEMESTER B.Sc.(APPLIED SCIENCES) IN ENGG.
EMBEDDED SYSTEMS [ICS 241 - S2]

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

Answer all the questions.

Missing data if any, may be suitably assumed.

1)	A)	Explain the concept of little-endian and big-endian byte ordering with relevant examples.	(3)
	B)	Explain ARM three-part instruction format of ARM with relevant examples.	(3)
	C)	Write a neat Diagram of general purpose registers (GPRs) and the ALU in ARM . List and give description of various ARM ALU instructions using GPRs.	(4)
2)	A)	Explain two types of rotations using ARM instruction set with relevant diagrams and examples.	(3)
	B)	Write ARM instructions used for regular multiply and long multiply and difference between them with suitable examples.	(3)
	C)	Write an ARM assembly language program to check whether a given number is even or odd.	(4)
3)	A)	List and explain the actions of various ARM conditional branch instructions for unsigned data.	(3)
	B)	Show how the computer would represent -6 in 2's complement for (a) 8 bit (b) 16 bit and (c) 32 bit data sizes.	(3)
	C)	Write a flowchart and corresponding program to place the value 0x55 into 200 consecutive bytes of RAM locations.	(4)
4)	A)	Write a descriptive note on Registers used for LPC1768 Timer Programming.	(3)
	B)	Write an assembly language program to generate N Fibonacci series numbers and store it in contiguous memory locations. (Use subroutine)	(3)

C) How signed number multiplication is performed in ARM? Write a program to multiply two 32-bit signed numbers -2500 and -200 stored in registers R1 and R0 respectively using suitable ARM instructions. Show content of all registers after multiplication in Hexadecimal form. (4)

5) How pins of LPC1768 MCU are multiplexes using PINSELx registers? Explain with relevant diagrams and examples. (3)

A)

B) Write a C program to display an 8-bit binary up counter on the LEDs. (3)

C) Write a ARM 7-segment interfacing program to Display 4321 over display units. (4)

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