Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2022

Subject Code:3151107 Date:06-01-2023

Subject Name:Advance Microcontroller

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Why interrupt latency of FIQ is less than IRQ in ARM Microcontroller?	**03**
	(b)	What is the importance of condition codes with instructions in ARM Microcontroller?	**04**
	(c)	Explain difference between RISC and CISC architecture. What are the RISC features selected in and what are the features rejected in ARM?	**07**

Q.2	**(a)**	What is will be content in register R3 after executing following instructions in ARM Microcontroller?
		LDR R1,=0xFFFFFFFF
		LDR R2,=055555555
		BIC R3,R1,R2
			03

	(b)	Write assembly language subroutine to find value of Y in following equation: Y =16X+4 (Assume register R1 holds Y and register R2 holds X)	**04**
	(c)	What is exception? List types of exceptions occur in ARM processor. Explain registers available to programmers during exceptions.	**07**
		OR	
	(c)	Explain ARM7TDMI architecture and its programming model	**07**
Q.3	**(a)**	What is the special purpose of R13, R14 and R15 registers in ARM?	**03**
	(b)	Explain instructions: [a] LDMIA r0!,{r2-r6} [b] LDR R1,[R2,#8]! [c] TST r1,r2 [d] STR R0,[R1]	**04**
	(c)	Explain 3 stage and 5 stage pipeline used in ARM Microcontroller	**07**
		OR	
Q.3	**(a)**	Explain flags in ARM. What is the purpose of CPSR and SPSR?	**03**

	(b)	What will be content of register R1,R2 and R3 after executing following instructions?
		MOV R2,#0x04
		MOV R1,R2,LSL #3
		MVN R3,R2
		AND R2,R3,R1
			04

	(c)	What is the difference between branch instruction “B” and “BL” ? Explain branch instructions of ARM Microcontroller with suitable examples.	**07**

Q.4	**(a)**	What is the difference between physical and virtual memory?	**03**
	(b)	Explain the function of Translation look aside buffers in virtual memory system.	**04**
	(c)	What are the advantages and disadvantages of C programming for Embedded Systems over assembly programming? Explain any two optimization techniques of C program with help of example	**07**
		OR	
Q.4	**(a)**	Write C language program to set port pins P0.0 to P0.7 and P1.0 to P1.7 in ARM processor	**03**
	(b)	Explain flush and clean operation performed on a cache memory in ARM.	**04**
	(c)	Explain interfacing of 16x2 LCD with ARM Microcontroller. Draw interfacing diagram and write C language program to display message "Atma Nirbhar Bharat" on LCD.	**07**
Q.5	**(a)**	What is the name of signal used by AMBA's ASB bus master "x" to the bus arbiter to request bus and what is the name of bus grant signal communicated by bus arbiter?	**03**
	(b)	Explain AHB basic data transfer with help of diagram.	**04**
	(c)	Discuss UART Programming in ARM Microcontroller. Explain important registers used for UART programming.	**07**
		OR	
Q.5	**(a)**	What is the purpose of HLOCK signal produced by AHB Master?	**03**
	(b)	Explain programming steps for SPI programming	**04**
	(c)	Describe AMBA Arbitration with the help of a diagram for AMBA based system	**07**

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