Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2024

Subject Code:3151107 Date:28-11-2024

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)**	What is the Reduced Instruction Set Computer (RISC) design philosophy? List down features of its.	**03**
	(b)	Give different applications of ARM processors.	**04**
	(c)	Which are the different features of ARM instruction set that make it suitable for embedded applications?	**07**
Q.2	**(a)**	Explain Non-protected memory, MPU & MMU.	**03**
	(b)	With a neat diagram explain the different general purpose registers of ARM processors.	**04**
	(c)	What are banked registers? Show how the banked registers are utilized when the user mode changes to IRQ mode.	**07**
		OR	
	(c)	Explain ARM pipeline with 3,5,6 stages.	**07**
Q.3	**(a)**	Discuss variable storage class: Automatic, Register and static.	**03**
	(b)	List ARM development tools and advantages of Embedded C Programming.	**04**
	(c)	How are interrupts or exceptions handled in ARM processors?	**07**
		OR	
Q.3	**(a)**	Justify the statement “Virtual memory is illusion of large main memory”.	**03**
	(b)	Explain following instructions with at least one example for each. (1) BIC (2) EOR (3) TEQ (4) RSB	**04**
	(c)	What is the use of paging mechanism? Show how paging is done in any of ARM families of processors.	**07**
Q.4	**(a)**	What is the advantage of barrel shifter in ARM?	**03**
	(b)	How will you perform bit-wise operation in C using ARM compiler?	**04**
	(c)	Write a c program that send and receive data from UART device interfaced with ARM.	**07**
		OR	
Q.4	**(a)**	Explain following directives of ARM assembler 1. EQU 2. RN 3. ALIGN	**03**
	(b)	Explain flush and clean operation performed on a cache memory in ARM	**04**
	(c)	Discuss techniques for optimization of memory needs while writing C program for ARM based microcontroller.	**07**
Q.5	**(a)**	What is a Thumb mode in ARM? Explain in brief.	**03**

	(b)	Write ARM assembly language program for HEX number to ASCII conversion. Assume HEX number is stored in register R1.	**04**
	(c)	Draw interfacing diagram to interface LCD with ARM processor. Write Assembly or C program to display message “DIGITAL INDIA” on the LCD.	**07**

OR

Q.5	**(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)	Compare AHB and APB of AMBA bus system of ARM Architecture.	**04**
	(c)	Write a short note on stack implementation in ARM.	**07**

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