Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2023

Subject Code:3161009 Date:14-07-2023

Subject Name:Embedded Systems

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)**	Write down the skills required for an Embedded System Designer.	**03**
	(b)	Describe an embedded processor as (i) GPP (ii) ASIP (iii) Single purpose processor.	**04**
	(c)	Differentiate between serial and parallel communication. Explain USART protocol in brief.	**07**
Q.2	**(a)**	Describe the features associated with Bluetooth and Zigbee protocols used in wireless and mobile systems.	**03**
	(b)	List the features associated with AHB and ASB Buses.	**04**
	(c)	Explain I2C and CAN bus protocol in brief.	**07**
		OR	
	(c)	What is Device driver? Explain role of Interrupt in Device driver programming.	**07**
Q.3	**(a)**	Explain different types of interrupt sources.	**03**
	(b)	What is Semaphore? Explain where Semaphore can be utilized?	**04**
	(c)	Give advantages, disadvantages and uses of mailbox, pipe and socket functions in interprocess communication.	**07**
		OR	
Q.3	**(a)**	Explain the differences between Preemptive & Non-Preemptive scheduling policies.	**03**
	(b)	Define Interrupt Latency and Interrupt Service Deadline. Describe the parameters that govern their values	**04**
	(c)	Explain device, file and I/O management in RTOS.	**07**
Q.4	**(a)**	What is RTOS ? Describe types of RTOS with two examples.	**03**
	(b)	Define and explain different Benchmarking parameters for an RTOS.	**04**
	(c)	Explain process context switching and thread context switching in detail. Justify “threads are lightweight processes”.	**07**
		OR	
Q.4	**(a)**	Define: Process Control Block. Which data is stored in PCB?	**03**
	(b)	Describe the differences between Hard Real Time and Soft Real Time System with an example of each one.	**04**
	(c)	Compare process, task and thread with an appropriate example. Explain multithreading mechanism in context of the display process of desktop systems.	**07**
Q.5	**(a)**	Explain the function of Watchdog timer in MSP430 processor.	**03**
	(b)	Describe the four sources of clock in MSP430 processor	**04**
	(c)	Explain interrupt handling process in MSP430.	**07**
		OR	
Q.5	**(a)**	Describe POR, PUC and BOR for MSP430.	**03**
	(b)	MSP430 is having an orthogonal CPU architecture supported with RISC features. – Justify the statement.	**04**
	(c)	Explain the use of timer for generating Pulse Width Modulated waveform using MSP430.	**07**