GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER–VI (NEW) EXAMINATION – WINTER 2024

Subject Code:3161009   **Date:05-12-2024**
Subject Name:Embedded Systems
Time:02:30 PM TO 05:00 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)**	Define Embedded Systems.	**03**
	(b)	Describe the components of an Embedded System.	**04**
	(c)	Discuss the design process in embedded systems with examples.	**07**
Q.2	**(a)**	Explain the role of Timer and Counting Devices in embedded systems.	**03**
	(b)	Compare and contrast various Serial Communication protocols.	**04**
	(c)	Discuss the features and applications of Parallel Communication protocols.	**07**
		OR	
	(c)	Explain Wireless Communication protocols and their significance in embedded systems.	**07**
Q.3	**(a)**	What is an Interrupt Service Routine (ISR)?	**03**
	(b)	Describe the concept of Interrupt Latency and its impact.	**04**
	(c)	Explain the role of Device Driver Programming in embedded systems.	**07**
		OR	
Q.3	**(a)**	Discuss the context-switching mechanism in the presence of multiple interrupts.	**03**
	(b)	Explain the Direct Memory Access (DMA) concept.	**04**
	(c)	Describe the classification of processor interrupt service mechanisms	**07**
Q.4	**(a)**	Explain the significance of semaphores in inter-process communication.	**03**
	(b)	Discuss various IPC mechanisms such as message queues and sockets.	**04**
	(c)	Compare the characteristics of tasks and ISRs.	**07**
		OR	
Q.4	**(a)**	Describe shared data management in multi-threaded applications.	**03**
	(b)	Explain the use of Pipe Functions in IPC.	**04**
	(c)	Discuss the role of signal functions in process communication.	**07**
Q.5	**(a)**	Define the key features of an Operating System.	**03**
	(b)	Compare cooperative and preemptive multitasking.	**04**
	(c)	Compare Rate-Monotonic Scheduling and Earliest-Deadline First Scheduling.	**07**
		OR	

Q.5 **(a)** What are the key features of the MSP430 architecture? **03**

(b) Explain the difference between clock-driven and event-driven scheduling. **04**

(c) Discuss the low-power features of MSP430 microcontrollers. **07**

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