Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3161009 Date:17-12-2022

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)**	Classify Embedded system and discuss the various components of embedded system design in brief.	**03**
	(b)	Explain SPI bus protocol to establish serial communication between a processor and a device.	**04**
	(c)	List and explain the protocols used for wireless and mobile system communication.	**07**
Q.2	**(a)**	Discuss shared data problems and give solutions to such problems.	**03**
	(b)	What do you understand by Interrupt Service Thread? Explain its usage with an example in RTOS based systems.	**04**
	(c)	What is a device driver? What are its requirements? Describe the information required for writing a device driver.	**07**
		OR	
	(c)	What is DMA? Using diagram show the operation of a DMA controller.	**07**
Q.3	**(a)**	Name all the RTOS task scheduling models. Describe any one in brief.	**03**
	(b)	State the differences between a Task, a Function and an Interrupt Service Routine.	**04**
	(c)	Describe the features available with Watch Dog Timer along with its requirements in embedded system design.	**07**
		OR	
Q.3	**(a)**	Define Interrupt Latency and Interrupt Service Deadline. Describe the parameters that govern their values.	**03**
	(b)	Explain concept of interrupt service routine.	**04**
	(c)	Describe the significance of File and I/O management along with supported functions in RTOS	**07**
Q.4	**(a)**	Compare hard real time and soft real time.	**03**
	(b)	Write short note on memory management.	**04**
	(c)	Compare process, task and thread with appropriate example. Also explain multithreading mechanism in context of display process of mobile phone.	**07**
		OR	
Q.4	**(a)**	What is a Scheduler? Explain any one scheduling policies.	**03**
	(b)	Discuss use of a semaphore as an event signaling or notifying variable in brief.	**04**
	(c)	What do you mean by Mutex. Also explain P and V semaphore with appropriate example.	**07**

Q.5	**(a)**	Explain the multiplexing scheme in MSP430 processor for the port pins.	**03**
	(b)	Explain the clocking system of MSP430.	**04**
	(c)	Describe the interrupt feature associated with Timer in MSP430.	**07**

OR

Q.5	**(a)**	Explain the special features associated with GPIO port pins in MSP430 other than simple digital input output port pin characteristics.	**03**
	(b)	Draw and explain the basic architecture and block diagram of MSP430.	**04**
	(c)	Explain a Timer module of MSP430 with various modes of operation associated with it.	**07**

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