Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3161009 Date:10/06/2022

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)**	Define and classify the embedded systems, give few examples of such systems.	**03**
	(b)	Describe skills required for embedded design engineer.	**04**
	(c)	Describe Direct Memory Access.	**07**
Q.2	**(a)**	Define RTOS. Enlist types of RTOS with examples.	**03**
	(b)	Describe Watch Dog Timer and Brown Out Reset with example.	**04**
	(c)	Compare Wi-Fi, Blue-tooth and Zigbee algorithm	**07**
		OR	
	(c)	Compare the advantages and disadvantages of data transfers using serial and parallel ports devices. Describe SPI protocol.	**07**
Q.3	**(a)**	Describe busy wait approach for accessing IO.	**03**
	(b)	Differentiate : Process and Thread	**04**
	(c)	Describe shared data problem with example. How to solve this issue?	**07**
		OR	
Q.3	**(a)**	Describe interrupt mechanism for accessing IO.	**03**
	(b)	Describe Mailbox function for IPC.	**04**
	(c)	Describe Priority inversion and Deadlock condition. How to solve these issues?	**07**
Q.4	**(a)**	Describe Earliest Deadline First Mechanism with example.	**03**
	(b)	Differentiate : Binary Semaphore and Mutex	**04**
	(c)	Describe Round-robin with interrupt mechanism for embedded software.	**07**
		OR	
Q.4	**(a)**	Define : Process Control Block. Which data is stored in PCB?	**03**
	(b)	Describe Critical Section. How to achieve this functionality in programming.	**04**
	(c)	Describe co-operative and pre-emptive scheduling mechanism.	**07**
Q.5	**(a)**	Sketch and Describe block diagram of MSP430	**03**
	(b)	Describe low-power modes of MSP430.	**04**
	(c)	Common cathode seven-segment and push-button is connected with MSP430. Sketch interfacing diagram and write C-code to count number of times switch is pressed (Use interrupt subroutine when switch is connected)	**07**

OR

Q.5	**(a)**	Describe multiplexing scheme in MSP430 processor for the port pins.	**03**
	(b)	Describe clocking system of MSP430.	**04**
	(c)	Describe MSP430 timer modes available for Timer-A. Write C-Program for MSP430 to generate 1KHz square wave on pin P1.0 using Timer-A.	**07**

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