Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER– VI EXAMINATION – SUMMER 2026

Subject Code:3161009 Date:01-06-2026

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)**	Briefly describe, i. SPI, ii. I2C & iii. ASIC	**03**
	(b)	Differentiate General Purpose Processor and Application Specific Instruction-Set Processor.	**04**
	(c)	There are many systems around you that are very good example of embedded systems' implementation, describe any one of them using the knowledge you acquired from this subject. Use your level best illustration.	**07**
Q.2	**(a)**	What is Reset in Embedded Systems? Why Brown Out Reset functionality is required in processor?	**03**
	(b)	Justify : Universal Serial Bus is really universal.	**04**
	(c)	Why debugging is required in embedded systems development process? Explain the role of JTAG in it.	**07**
		OR	
	(c)	Describe the evolution of Bus Interfaces in embedded system in brief.	**07**
Q.3	**(a)**	What is SWI (Software Interrupt)? How it is used in device drivers?	**03**
	(b)	Explain use of interrupts, interrupt vectors, vector table and masking.	**04**
	(c)	What are DACs and ADCs? How PWM is used in this DAC? Mention how interrupt is used in handling DAC/ADC processes?	**07**
		OR	
Q.3	**(a)**	Explain Virtual Device Drivers.	**03**
	(b)	Define context, interrupt latency and interrupt service deadline.	**04**
	(c)	What is IDE? List and explain all the Software and Hardware Tools used in Embedded Systems Design in brief.	**07**
Q.4	**(a)**	Explain Process, State and Scheduling from OS's Point of View.	**03**
	(b)	List and explain features of RTOS.	**04**
	(c)	What is a Semaphore? Explain the use of Semaphores as Event Signaling, Resource Key and Task Synchronizer.	**07**
		OR	
Q.4	**(a)**	Differentiate Functions, ISR and Task	**03**
	(b)	Differentiate Hard and Soft Realtime OS.	**04**
	(c)	Explain the Layered Structure of an OS. Discuss Kernel and it functions along with User and Supervisory Modes.	**07**
Q.5	**(a)**	List and explain any three features that makes MSP430 a different microcontroller as compared to others.	**03**
	(b)	List Basic Functions of RTOSs.	**04**
	(c)	Design an embedded system using MSP430 two special features. Show using Block Diagram and explain only the special features used.	**07**
		OR	

Q.5	**(a)**	Draw the architectural block diagram of MSP430.	**03**
	(b)	Write a short note on various types of timers in MSP430 microcontroller	**04**
	(c)	Discuss Earliest Deadline First (EDF) precedence and Rate Monotonic Schedulers (RMS) Models.	**07**

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