Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 710409N Date: 16-01-2013

Subject Name: Embedded System Design

Time: 02.30 pm – 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.**

Q.1	**(a)**	Enlist and explain various necessary blocks of an embedded system.	**07**
	(b)	Why a microcontroller will be preferred over a microprocessor to build an embedded system? Briefly explain some important utilities available in an embedded controller.	**07**
Q.2	**(a)**	Differentiate between an SRAM and a DRAM. Enlist various types of SRAMs available for designing an embedded system.	**07**
	(b)	Explain the basic difference between the CISC and RISC processor architectures.	**07**
		---------- OR ----------	
	(b)	What is a real time clock (RTC)? What should be the capabilities of an RTC IC in context with a real time embedded system?	**07**
Q.3	**(a)**	What is an I^2C protocol? With neat figure explain the data transfer on an I^2C bus clearly stating the Start, Acknowledge and Stop conditions.	**07**
	(b)	Explain the serial peripheral interface architecture with necessary figures.	**07**
		---------- OR ----------	
Q.3	**(a)**	Differentiate between Synchronous and Asynchronous serial transmission/ reception. Draw and explain the block diagram of UART.	**07**
	(b)	Explain the USB and JTAG interfaces with necessary sketches.	**07**
Q.4	**(a)**	Explain the concepts of *multitasking* and *scheduling* in context with an RTOS.	**07**
	(b)	What is an *exception* in an RTOS? Explain an exception handling algorithm in detail.	**07**
		---------- OR ----------	
Q.4	**(a)**	Explain the various software writing approaches for an embedded application. Enlist and explain the compilation steps.	**07**
Q.4	**(b)**	How is a signal conditioning block useful in the design of an embedded system? Explain in context of a real time embedded application.	**07**
Q.5	**(a)**	Let three controller choices be given: 8051, PIC and ARM. Design and discuss a real-time embedded system case study example using *any* of the given controllers.	**07**
	(b)	Explain the following features of an embedded controller: Power-on reset, Brown-out reset and Watchdog timer.	**07**
		---------- OR ----------	
Q.5	**(a)**	What is debugging? Explain some useful debugging techniques employed in an embedded system.	**07**
	(b)	Enlist various real time embedded system examples. Explain any one of them in detail.	**07**

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