Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2013

Subject code: 710409N **Date: 06-01-2014**

Subject Name: Embedded System Design

Time: 10.30 am – 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.**

Q.1 **(a)** Describe the differences between CISC and RISC CPU with their merits and demerits for Embedded System design. **07**

(b) Answer the following questions. **07**

1) Explain the benefits of SRAM over DRAM memory cells.
2) Explain the differences between a soft real time system and a hard real time system.

Q.2 **(a)** It is required to generate Pulse Width Modulated wave on port pin P1.7 in 8051 microcontroller. Use Timer 0 and Timer 1 separately to define ON time and OFF time as 30% and 70% respectively to achieve 1 KHz wave on Port Pin P1.7. Use Crystal frequency of 12 MHz. Write an 8051 program to achieve this task. **07**

(b) Explain the limitations of 8051 microcontroller in the implementation of an embedded system requiring high speed and low power consumption. **07**

OR

(b) Explain the requirements of Interrupt feature associated with Timer and UART in 8051 microcontroller. **07**

Q.3 **(a)** Answer the following questions. **07**

1) Hard Real Time Systems require application development with Real Time Operating System (RTOS) support. – Justify the statement.
2) Explain characteristics of Preemptive and Non preemptive scheduling policies with their merits and demerits.

(b) Explain the problem of Priority Inversion with its solution. **07**

OR

Q.3 **(a)** Answer the following questions. **07**

1) What is deadlock? Explain its remedies.
2) Explain Mutual Exclusion with its requirements in RTOS based environments.

(b) Explain various states of a Task in RTOS environment. **07**

Q.4 **(a)** In the memory design with DRAM cells, explain the requirement of refresh logic with necessary block diagram. **07**

(b) A pressure sensor is required to be interfaced with 8051 to monitor the pressure in the range of 0 to 300 mmHg. Full scale voltage of the pressure sensor is 1 milivolt. Design a signal conditioning circuit to amplify the pressure signal. Interface appropriate ADC with 8051 and write program to monitor pressure in terms of XXX.Y mmHg on multiplexed seven segment LEDs. **07**

OR

Q.4 **(a)** Configure 8051 Timer to generate a baud rate of 9600 for UART communication. Write Interrupt driven program to transmit as well as receive data to and from 8051 to personal computer. Use Crystal frequency of 11.0592 MHz. **07**

Q.4 **(b)** Answer the following questions. **07**

1) Explain various data types supported by C programming language.
2) Explain the differences between a global and static declaration for a variable in C programming language.

Q.5 **(a)** Explain Interrupt Transfers supported in USB protocol. **07**

(b) Answer the following questions. **07**

1) Explain the use of power down mode in an Embedded System design.
2) Explain the use of Modem Control signals in Asynchronous Serial Communication.

OR

Q.5 **(a)** Explain the differences between I2C and SPI serial bus protocols with signals supported by them. **07**

(b) Answer the following questions. **07**

1) Explain TAP controller in association with JTAG port and signals supported by it.
2) How Watch dog timer is different from a general purpose Timer available in a microcontroller?

****