Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2013

Subject code: 1710409 **Date: 12-06-2013**

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 components of an embedded system and explain the classification of Embedded systems. **07**

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

1) Explain the features of Memory Shadowing with its area of application in Embedded Systems.
2) Explain the merits and demerits of DRAM and SRAM memories.

Q.2 **(a)** A pressure sensor gives a differential signal in the range of 0 to 1 milivolts for 0 to 100 mmHg pressure. It is required to amplify this signal and digitize with the help of 8 bit Analog to Digital Convertor. Show the interfacing with 8051 microcontroller to read digital values of pressure signal so as to have maximum resolution. Write a óCô program for reading the pressure and calibrate the result so as to represent the reading in XX.Y mmHg. **07**

(b) Compare the architectural features of 8051 with one of the advance microcontroller features available in market. **07**

OR

(b) Explain Sequential and Concurrent programming models to build application software for Embedded system. **07**

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

1) What is a scheduler? Explain Preemptive and Non Preemptive scheduling algorithms.
2) What is multithreading? Explain the differences between a process and a thread?

(b) How application software is built with the support provided by an RTOS? Explain the requirements of RTOS for hard Real Time system implementation. **07**

OR

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

1) What is deadlock? Explain the reasons for deadlock situations.
2) What is the need of mutual exclusion in RTOS? How is it implemented?

(b) Explain the problem of Priority Inversion in RTOS? How this problem is solved? **07**

Q.4 **(a)** Explain the merits and demerits associated with both assembly language and higher level language programming. **07**

(b) Explain the DRAM refresh logic in the implementation of dynamic memories. **07**

OR

Q.4 **(a)** Write a óCô language program to generate Pulse Width Modulated signal of frequency 1 Khz on Port Pin P1.0, with On time and Off time defined in terms of % by the variables used in program. Use Timer to generate all the required delays. Use crystal of 12 Mhz. **07**

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

1) Explain the Data Flow Graph model with its specific use in Embedded software design.
2) Explain the benefits achieved with writing program using power down mode features of a microcontroller.

Q.5 **(a)** What is a USB Endpoint? Explain Interrupt Transfer Endpoint with its features. **07**

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

1) What is the difference between Power on reset and Brown out reset? State its significance in the microcontrollers.
2) Explain the handshaking of Modem control signals used during communication establishment between two Data Terminal Equipments.

OR

Q.5 **(a)** Describe the features supported with I^2C bus protocol along with their applications. **07**

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

1) What is JTAG? What is its use in Embedded System design?
2) Describe the features of SPI interface.

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