Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – WINTER • 2014

Subject code: 1710409 **Date: 10-12-2014**

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)** Describe characteristics of an embedded system with Embedded Microcontroller core requirements. **07**

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

1) Explain specific requirements of RAM and FLASH memory in Embedded systems applications.
2) Justify the memory size requirements on mother board and on hard disk.

Q.2 **(a)** It is required to design an embedded system for the monitoring of room temperature. The temperature sensor gives 0 to 10 milivolts of output for 0 to 50°C temperature. Design signal conditioning circuit appropriately and interface an analog to digital convertor with +5V reference with 8051 microcontroller. Write a program for reading the temperature to show the reading on seven segment LEDs with 0.1^{o}C resolution. **07**

(b) Explain the merits and demerits of an assembly language programming and higher level language programming for Embedded System design. **07**

OR

(b) Explain the characteristics and roll of timers in Embedded applications. Describe the timer features supported for handling time critical actions? **07**

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

1) Why do we require application development with Real Time Operating System (RTOS) support?
2) Explain the multitasking feature supported by an RTOS.

(b) What is Process Control Block? Explain its requirement along with its contents. **07**

OR

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

1) What is starvation? Explain the reasons along with its remedies.
2) What is Semaphore? Explain the difference between binary and counting Semaphore.

(b) Explain Scheduling policies for the implementation of RTOS. **07**

Q.4 **(a)** Explain complete refresh logic for DRAM cells with necessary block diagram. **07**

(b) Write a program for 8051 microcontroller to calculate the time difference between two rising edges of clock pulses given as input to Port pins P1.0 and P1.1. Use 6 MHz crystal clock for the system. **07**

OR

Q.4 **(a)** Explain the timer function in 8051 microcontroller to generate baud rate for UART. Interface 10 keys numbered as 0 to 9 with 8051 microcontroller and write a program to transmit ASCII value of a character on UART port, based on input for any key numbered as 0 to 9 . **07**

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

1) Explain the use of preprocessor directives in the C programming language.
2) Explain the differences between a compiler and a cross compiler.

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

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

1) What are the requirements of power down modes in advance microcontrollers?
2) Explain the role of Data Terminal Equipment (DTE) and Data Communication Equipment (DCE) with required handshaking signals in RS232 based communication.

OR

Q.5 **(a)** Explain the functioning of Watch Dog Timer. Discuss its application in Embedded system design. **07**

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

1) Explain the characteristics of JTAG port with its signals.
2) Describe the features of I^2C serial interface with its applications in Embedded system design.