

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E Sem-I Remedial Examination January/ February 2011****Subject code: 710409****Subject Name: Embedded Systems Design****Date: 03 /02 /2011****Time: 02.30 pm – 05.00 pm
Total Marks: 60****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Answer the following questions: **06**
- i. Define an Embedded system giving a few examples of the same.
 - ii. What is an embedded controller? Enlist and explain, in brief, the necessary features of an embedded controller.
- (b)** Draw the block diagram of an embedded system- a closed loop temperature monitoring system- which will display the current and desired temperature. Explain the significance of each block to be used in the designs. **06**
- Q.2 (a)** Explain various real-time programming languages used for an embedded system. Why C/C++ languages are preferred over assembly languages? **06**
- (b)** What is an RTOS? Explain the concepts of *multitasking* and *context switching* in an RTOS. **06**
- OR**
- (b)** What is a *scheduler*? Enlist and explain various scheduler algorithms of an RTOS. **06**
- Q.3 (a)** What is an I²C protocol? With neat figure explain the data transfer on an I²C bus clearly stating the Start, Acknowledge and Stop conditions. **06**
- (b)** Differentiate between Synchronous and Asynchronous serial transmission/ reception. Draw and explain the block diagram of UART. **06**
- OR**
- Q.3 (a)** With reference to an RTOS, explain the concepts of *dynamic memory allocation* and *relocatability* in details with neat sketches. **06**
- (b)** What are *exceptions* in an RTOS? Enlist various exception handling mechanisms and explain *any one* in detail. **06**
- Q.4 (a)** Describe Modern Serial Interface standards: Modems, USB and JTAG. **06**
- (b)** Write a note on Embedded memories. Enlist the steps to write the flash or EEPROM data memory. **06**

OR

- Q.4** (a) Differentiate between an SRAM and DRAM. How does an SRAM/ DRAM controller function? **06**
- (b) Explain in detail about the hardware and software debugging tools used for embedded systems design. **06**
- Q.5** (a) How signal conditioning is important in embedded system? Explain with a suitable example. **06**
- (b) 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. **06**

OR

- Q.5** (a) Explain the following features of an embedded controller: Power-on reset, Brown-out reset and Watchdog timer. **06**
- (b) What is the difference between RISC and CISC processors? State the importance of a RISC processor in context with Embedded system design. **06**
