## **GUJARAT TECHNOLOGICAL UNIVERSITY** M. E. - SEMESTER – III • EXAMINATION – SUMMER • 2014

Subject code: 730204 Subject Name: Embedded Systems Time: 02:30 pm - 05:00 pm Instructions: Date: 05-06-2014

## Total Marks: 70

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) What are the characteristics of an embedded system design? List the 07 design metrics used to compare them.
  - (b) Explain how the top-down design process improves the productivity. 07
- Q.2 (a) With a neat diagram explain the advance RAM architecture. Also 07 explain how this is extended to improve the performance through synchronous DRAM.
  - (b) Differentiate between hard and soft RTOS highlighting the advantages 07 and disadvantages of each.

#### OR

- (b) Discuss the role of RTOS in interrupt handling and task scheduling. 07
- Q.3 (a) Show and explain the interfacing of system buses between the processor, 07 memory and I/O devices.
  - (b) What is meant by Specification? Explain the advanced techniques for 07 specification with example.

#### OR

Q.3 (a) Design a single purpose processor that outputs Fibonacci number up to n 07 places. Start with a function computing the desired result, translate it into a state diagram, and sketch a probable datapath.

# (b) Differentiate between (i) Single purpose and general purpose processors (ii) Synchronous communication and iso- synchronous communication

- Q.4 (a) Give pseudo code for a pair of functions implementing the send and 07 receive communication constructs.
  - **(b)** Compose 1K×8 ROMs into a 2K×16 ROM

### OR

- Q.4 (a) Four lights are connected to a decoder. Build a circuit that will blink the 07 lights in the following order: 0, 2, 1, 3, 0, 2 -----Start from a state diagram, draw the state table, minimize the logic, and draw the final circuit.
  - (b) Explain in detail about FSM synthesis. 07
- Q.5 (a) List and define the three main IC technologies. What are the benefits of 07 using each of the three different IC technologies?
  - (b) Show how to extend the number of ports on a 4-port 8051 to 8 by using 07 extended parallel I/O.

(i) Using block diagrams for the 8051 and the extended parallel I/O device, draw and label all interconnections and I/O ports. Clearly indicate the names and widths of all connections.

07

(ii) Give C code for a function that could be used to write to the extended ports.

#### OR

- Q.5 (a) Explain Hardware/Software Co-Simulation. What is the key method for 07 speeding up such simulation?
  - (b) Explain the case study of an embedded system for sending application 07 layer byte on a TCP/IP network.

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