USN ☐☐☐☐☐☐☐☐☐☐   06EC762

Seventh Semester B.E. Degree Examination, June 2012
Real Time Systems

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. Define a real time system. Explain generalized computer control system with hardware and software interface details.   **(10 Marks)**
   b. Classify real time systems based on time constraint with an example for each and appropriate equations.   **(10 Marks)**

2 a. With a neat block diagram, explain Direct Digital Control.   **(07 Marks)**
   b. Write PID control algorithm.   **(03 Marks)**
   c. Describe supervisory control with a neat block diagram.   **(06 Marks)**
   d. Discuss gain scheduled programmed adaptive control.   **(04 Marks)**

3 a. Briefly explain the following:
      i) Parallel computers   ii) Polling   iii) DMA   **(06 Marks)**
   b. Explain analog interface for input and output operation.   **(08 Marks)**
   c. With a neat block diagram, explain interrupt masking.   **(06 Marks)**

4 a. Define CUTLASS. What are the major requirements of CUTLASS? Describe CUTLASS host target configuration.   **(10 Marks)**
   b. With an example program, Explain interrupts and device handling.   **(10 Marks)**

PART – B

5 a. Explain typical structure of a real time operating system (RTOS).   **(06 Marks)**
   b. What are the basic functions of the task management module? With system commands explain RTOS task state diagram.   **(10 Marks)**
   c. What do you mean by minimum operating system Kernel? List its functions. **(04 Marks)**

6 a. What is code sharing? How do you overcome code sharing problem? Explain. **(10 Marks)**
   b. Write a note on detailed arrangement of IOSS.   **(05 Marks)**
   c. Explain different mechanisms supported by RTOS for the transfer of data between tasks.
                                                                          (05 Marks)

7 a. Discuss preliminary design details of real time system.   **(10 Marks)**
   b. Define mutual exclusion principle and explain mutual exclusion with a neat flow chart and sample program.   **(10 Marks)**

8 a. Write a note on:
      i)   Yourdon methodology.   **(05 Marks)**
      ii) Drying oven-context diagram.   **(07 Marks)**
   b. Differentiate : Ward and Mellor methodology and Hotley and Pirbai methodology.
                                                                          (05 Marks)
   c. List various real time system development methodologies.   **(03 Marks)**

* * * * *

USN ☐☐☐☐☐☐☐☐☐☐   06EC762

Seventh Semester B.E. Degree Examination, December 2011
Real Time Systems

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1.   a. Define real time systems. Explain different types of real time systems.   (04 Marks)
    b. Describe the elements of a computer control system.   (08 Marks)
    c. Discuss the different types of programs in system design.   (06 Marks)
    d. Classify RTS, based on time constraints.   (02 Marks)

2.   a. With an example, explain sequence control in field application.   (10 Marks)
    b. Explain supervisory control, with an example.   (05 Marks)
    c. Write a note on Hierarchical systems.   (05 Marks)

3.   a. Explain digital signal interference, with a neat diagram.   (08 Marks)
    b. Describe multi – level interrupts.   (06 Marks)
    c. Write an explanatory note on pulse input and output interfaces.   (06 Marks)

4.   a. Discuss the requirements that a user should look for, in a programming language.   (08 Marks)
    b. Define the following with respect to real time programming languages :
      i) Scope and visibility   ii) Global and local variables   iii) Modularity
      iv) Data types   v) Derived types   vi) Exception handling.   (12 Marks)

PART – B

5.   a. Discuss the two methods of code sharing, in detail.   (08 Marks)
    b. Briefly explain mutual exclusion.   (06 Marks)
    c. What are the two scheduling strategies? Explain briefly.   (06 Marks)

6.   a. Explain data transfer without synchronization.   (08 Marks)
    b. What do you mean by semaphores? Explain.   (06 Marks)
    c. List and explain the three levels of priority structures.   (06 Marks)

7.   a. Explain mutual exclusion, using conditional flags.   (06 Marks)
    b. With a neat flow chart, describe the single program approach, with reference to RTS design.
                                                (08 Marks)
    c. Write a note on the basic software module, with respect to RTS.   (06 Marks)

8.   Write explanatory notes on the following :
    a. Hatley and Pirbhai method.   (10 Marks)
    b. Ward and Mellar method.   (10 Marks)

* * * * *

USN | | | | | | | | | |

06EC762

Seventh Semester B.E. Degree Examination, December 2010
Real Time Systems

Time: 3 hrs.

Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from Part – A and Part - B.*

PART – A

1   a. Define real time system. Explain the different classifications of RTS with examples.
        (10 Marks)
    b. Define the term "time constraint". How are RTS classified based on time constraint? Explain them with appropriate equations.
        (10 Marks)

2   a. What do you mean by adaptive control? With a neat block diagram, explain any two types.
        (10 Marks)
    b. What is a DDC? What are the advantages of DDC over analog control? Discuss PID control algorithms.
        (10 Marks)

3   a. Explain pulse interface for input and output operation, with a neat block diagram. **(10 Marks)**
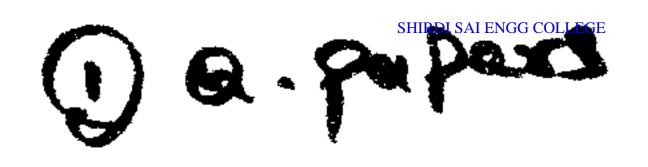   b. Explain the ISO seven layer model for data communication.
        (10 Marks)

4   a. How do strong data typing contribute to the security of programming language?   **(10 Marks)**
    b. What are the requirements, which CUTLASS has to meet? With a neat diagram, show CUTLASS host – target configuration.
        (10 Marks)

PART – B

5   a. With a neat block diagram, the explain typical structure of RTOS.   **(10 Marks)**
    b. Explain the different priority structures, adopted in designing a real – time system.**(10 Marks)**

6   a. What is task management? List the functions of task management. With a neat diagram, discuss different tasks.
        (10 Marks)
    b. Discuss the significance of memory management and hence explain task chaining and task overlapping.
        (10 Marks)

7   a. Explain the different phases involved in the design of a RTS.   **(10 Marks)**
    b. Explain foreground and background system with flow chart.   **(10 Marks)**

8   a. With a general arrangement for a drying oven, explain its requirements.   **(10 Marks)**
    b. Write about the environmental model, with context diagram for drying owen.   **(10 Marks)**

* * * * *

USN ☐☐☐☐☐☐☐☐☐☐

EC845

Eighth Semester B.E. Degree Examination, May/June 08
Real Time Systems

Time: 3 hrs.
Max. Marks:100

Note : *Answer any FIVE full questions.*

1 a. What are the issues to be considered in real time computing? Explain any 2 examples for real time computing or processing. **(08 Marks)**
  b. Differentiate between the following:
    i) Periodic and a periodic tasks
    ii) Critical and non – critical tasks
    iii) Reliability and Availability. **(06 Marks)**
  c. Write the structure of a real time system and explain its working. **(06 Marks)**

2 a. With a block schematic and timing diagram, explain the working of a 2stage pipeline and estimate the time required for any one special case. **(08 Marks)**
  b. Discuss "performability" in a real time system. **(06 Marks)**
  c. Explain how the source code can be analysed for determining the execution time. **(06 Marks)**

3 a. Explain RM (Rate Monotonic) scheduling algorithm with an example and equation. **(08 Marks)**
  b. Write an optimal scheduling algorithm (IRIS1) for the case when the mandatory portions of all tasks are not all zeroes. **(08 Marks)**
  c. Describe a bin packing assignment algorithm for EDF (Earliest Deadline First). **(06 Marks)**

4 a. Describe VTCSMA protocol's algorithm with a flowchart and notations used. **(08 Marks)**
  b. Differentiate between
    i) Packet switching and circuit switching
    ii) Hierarchical RR protocol and polled bus protocol. **(06 Marks)**
  c. Prove the theorem:
  "In the absence of failures, the maximum cycle time of the token is no greater than twice the TTRT". Explain for two typical cases. **(06 Marks)**

5 a. Explain fault tolerant synchronization in H/W for VCO with a phase locked loop. **(08 Marks)**
  b. Describe the analysis of clock with necessary equation and figures. **(06 Marks)**
  c. Explain CNA algorithm used for software synchronization. What is its major drawback? **(06 Marks)**

6 a. Explain co – operative scheduling of ready tasks using an ordered list as per precedence constraints. **(08 Marks)**
  b. List the functions and activities of an RTOS. **(06 Marks)**
  c. Mention the various security functions and activities in an operating system. **(06 Marks)**

7 a. What are the important features of VX works for a sophisticated embedded system design? **(08 Marks)**
  b. Mention the RTOS system level functions in MUCOS and explain any two of them. **(06 Marks)**
  c. List the features of MUCOS. **(06 Marks)**

8 a. Describe the design of "Automatic chocolate vending machine", with block schematics and specifications. **(10 Marks)**
  b. Explain the case study on "coding for sending application layer byte stream on a TCP/IP network using Vxworks". **(10 Marks)**

*****