Seventh Semester B.Tech. Degree Examination, December 2016  
(2013 Scheme)  
13.705.3 : REAL TIME OPERATING SYSTEMS (T) 

Time: 3 Hours  
Max. Marks: 100

PART – A

Answer all questions. Each question carries 2 marks. (2 x 10 = 20 Marks) 

1. Write the functions of an operating system.

2. What do you mean by multiprogramming?

3. List the rules to decide if a function is Re-entrant.

4. What is Task state?

5. Define Throughput.

6. What is meant by Real Time System?

7. What is meant by Inter task communication?

8. Define Synchronization.

9. Define MicroC/OS – II.

10. What are the components of Embedded System?

PART – B

Answer any one question from each Module.

Module – I

11. a) Write in detail about Threading issues.  

b) What are the components of Process Control Block? Explain.  

OR
12. a) Explain the various Scheduling criteria in evaluating Scheduling algorithms.
   b) What is critical section? Specify the requirements for a solution to the critical
      section problem.
   c) Discuss the steps involved in process creation and process termination.

   Module – II

13. a) What is Semaphore? Explain the uses of Semaphores.
   b) Describe the structure of Real time Operating system in detail.

   OR

14. a) What are exceptions and interrupts? Explain the applications of exceptions
      and interrupts.
   b) Explain the different constraints handled by Real time systems.

   Module – III

15. a) What is meant by a pipe? How does a pipe differ from a queue?
   b) Verify the schedulability under EDF and construct the schedule of the following
      task set:

      \[
      \begin{array}{|c|c|c|}
        \hline
        & T_1 & T_2 & T_3 \\
        \hline
        C_i & 2 & 2 & 4 \\
        D_i & 5 & 4 & 8 \\
        T_i & 6 & 8 & 12 \\
        \hline
      \end{array}
      \]

      OR

16. a) Explain briefly about Mailbox related function.
   b) Given seven tasks, A, B, C, D, E, F and G, construct the precedence graph
      from the following precedence relations:
      \[
      \begin{align*}
      &A \rightarrow C \\
      &B \rightarrow C \quad B \rightarrow D \\
      &C \rightarrow E \quad C \rightarrow F \\
      &D \rightarrow F \quad D \rightarrow G \\
      \end{align*}
      \]

      Then assuming that all tasks arrive at time \( t = 0 \), have deadline \( D = 25 \), and
      computation times 2, 3, 3, 5, 1, 2, 5 respectively. Modify their arrival times
      and deadlines and schedule them EDF.
Module – IV

17. a) Explain in detail about data structure of real-time kernel. 10
b) Discuss in detail about concepts of UNIX and Window Operating System. 10

OR

18. a) Explain in detail about architecture of real time communication. 10
b) What do you mean by system overhead? How it is handled by the operating system? 5
c) Discuss about the CAB implementation of a real time kernel. 5