C.U.SHAH UNIVERSITY
Summer Examination-2017

Subject Name: Real-Time System
Subject Code: 5TE02RTS1   **Branch: M.Tech (CE)**
Semester: 2   Date: 12/05/2017   Time: 02:00 To 05:00   Marks: 70

Instructions:
    (1) Use of Programmable calculator and any other electronic instrument is prohibited.
    (2) Instructions written on main answer book are strictly to be obeyed.
    (3) Draw neat diagrams and figures (if necessary) at right places.
    (4) Assume suitable data if needed.

SECTION – I

Q-1   **Attempt the Following questions**   **07**
    a. List the applications of real time systems.
    b. "Round Robin Scheduling does not work for the real time applications", comment on the statement.
    c. A pure table-driven scheduler is not as proficient as a cyclic scheduler for scheduling a set of hard real-time tasks. Justify.
    d. Soft real time tasks do not have any associated time bounds. Justify
    e. Define Phase time
    f. Define scheduling point.
    g. Every safety critical real time system contains a fail safe state.

Q-2   **Attempt all questions**
    a. Explain the architecture of a real time system. How can you classify the tasks for the real time systems?   **05**
    b. Explain dynamic priority scheduling with example.   **05**
    c. How the scheduling points are determined in (i) clock driven, (ii) event-driven, (iii) hybrid schedulers?   **04**

OR

Q-2   **Attempt all questions**
    a. Explain hard, firm and soft real time system with suitable example.   **05**
    b. Discuss the concerns for selecting possible frame size in cyclic schedulers.   **05**
    c. Define valid, feasible, proficient and optimal scheduler.   **04**

Q-3   **Attempt all questions**
    a. Differentiate between classical uni-processor scheduling and fault tolerant scheduling.   **07**
    b. Determine whether the following set of periodic real time tasks is schedulable on a uni-processor using RMA.   **07**

Task	Start Time(ms)	Processing Time (ms)	Period (ms)	Deadline (ms)
T1	20	25	150	100
T2	40	7	40	40
T3	60	10	60	50
T4	25	10	30	20

OR

Q-3   **Attempt all questions**
   a. Given a Task Set, Check for schedulability of tasks under RMA and DMA: **07**
           T1: e1 = 10 ms, p1 = 50 ms, d1 = 35 ms
           T2: e2 = 15 ms, p2 =100 ms, d2 = 20ms
           T3: e3 =20 ms, p3 =200 ms, d3 =200ms
   b. Explain Earliest Deadline First (EDF) algorithm in detail. Also Explain MLF.   **07**

SECTION – II

Q-4   **Attempt the Following questions**   **07**
   a. Real-time processes are scheduled at higher priorities than the kernel processes in RTLinux. Justify.
   b. A separate queue is maintained for the waiting tasks for each critical resource in HLP. Justify.
   c. Can PIP and PCP be considered as greedy algorithms?
   d. How a network topology is important for real time communication?
   e. Why are algorithms which can satisfactorily schedule real-time tasks on multi-processors not satisfactory to schedule real-time tasks on distributed systems?
   f. Define priority inversion.
   g. What is the difference between synchronous and asynchronous I/O?

Q-5   **Attempt all questions**
   a. How are deadlocks, unbounded priority inversions, and chain blocking prevented using PCP?   **07**
   b. What are the drawbacks in using Unix kernel for developing real-time applications?   **07**

OR

Q-5   **Attempt all questions**
   a. What are the performance measures for real time systems? Discuss the properties that the different performance measures should have.   **07**
   b. Define HLP and shortcomings of it.   **07**

Q-6   **Attempt all questions**
   a. The resource computing requirement of tasks T1-T6 is mentioned in figure. T1-T6   **07**
           arranged in decreasing order of their priorities. Compute the direct inversion of a task might have to undergo.
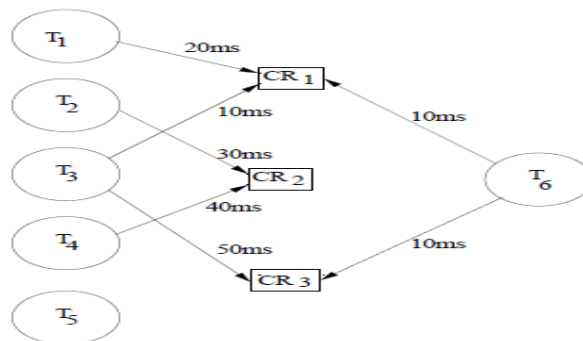
   b. Discuss Unix as a Real-Time Operating System.   **07**

OR

Q-6   **Attempt all Questions**

    a. Compare different resource sharing protocol with its advantages and disadvantages.   **07**

    b. Discuss shortcoming of Windows as a real-time system. Differentiate Windows and Unix.   **07**