C U SHAH UNIVERSITY
WADHWAN CITY

Branch: M Tech (CE)   **Semester: II**

Subject Code: 5TE02RTS1   **Subject Name: Real Time System**

Section – I

Q-1 Answer the following.   [7]

    1. With a suitable example explain the difference between the traditional notion of time and real-time.   [2]
    2. What is the difference between a performance constraint and a behavioral constraint in a real-time system?   [2]
    3. Explain the important differences between hard, firm and soft real- time systems.[2]
    4. Explain priority inversion in the context of real-time scheduling?   [1]

Q-2 Answer the following.   [14]

    1. Explain scheduling point of a task scheduling algorithm? How the scheduling points are determined in (i) clock-driven, (ii) event-driven, (iii) hybrid schedulers?   [7]
    2. What is understood by jitter associated with a periodic task? Mention techniques by which jitter can be overcome.   [7]

OR

    1. Explain event driven scheduling in detail.   [7]
    2. List and explain applications of Real time system   [7]

Q-3 Answer the following   [14]

    1. Explain RMA in detail   [5]
    2. Explain semaphore and mutex in real time systems   [5]
    3. It is difficult to achieve software fault tolerance as compared to hardware fault tolerance. Why?   [4]

OR

    1. List and explain different types of timing constraints that can occur in a real-time system?   **[7]**
    2. What is it required to synchronize the clocks in a distributed real- time system? Compare the advantages and disadvantages of centralized and the distributed clock synchronization.   [7]

Section – II

Q-4 State whether the following statements are TRUE or FALSE. Justify your answer.   [7]

    1. RMA is optimal for scheduling access of several hard real-time periodic tasks to a certain shared critical resource.
    2. Unless a suitable resource-sharing protocol is used, even the lowest priority task in a real-time system may suffer from unbounded priority inversions.

3. Scheduling a set of real-time tasks for access to a set of non-preemptable resources using PIP results in unbounded priority inversions for tasks.
4. A task can undergo priority inversion for some duration under PCP even if it does not require any resource
5. Task allocation is done statically in the focused addressing and bidding algorithm in distributed real-time systems.
6. Dynamic task arrivals can efficiently be handled using the focused addressing and bidding algorithm in multiprocessor-based real- time systems.
7. The communication overhead incurred due to Buddy algorithms is less compared to focused addressing and bidding algorithms in multiprocessor real-time task scheduling.

Q-5 Answer the following.   [14]

1. List and explain the important features that are required to be supported by a RTOS.
                                                                                          [7]
2. What is the difference between synchronous and asynchronous I/O? Which one is better suited for use in real-time applications?
                                                                                          [7]

OR

1. What are the shortcomings of Windows NT for developing a hard real-time application?   [7]
2. What are the drawbacks in using Unix kernel for developing real- time applications?
                                                                                          [7]

Q-6 Answer the following   [14]

1. Explain the differences between a system call and a function call? What problems may arise if a system call is made indistinguishable from a function call?   [7]
2. Explain the requirements of a real-time file system? How is it compared to traditional file systems?   [7]

OR

1. Distinguish traffic shaping and policing.   **[7]**
2. Define the concepts of additive, multiplicative and concave constraints that are normally used in QoS routing schemes.   [7]