

Enrollment No: \_\_\_\_\_

Exam Seat No: \_\_\_\_\_

# 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 05**

- 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 05**

- 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 07**

- 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:  $e_1 = 10$  ms,  $p_1 = 50$  ms,  $d_1 = 35$  ms  
 T2:  $e_2 = 15$  ms,  $p_2 = 100$  ms,  $d_2 = 20$  ms  
 T3:  $e_3 = 20$  ms,  $p_3 = 200$  ms,  $d_3 = 200$  ms
- b. Explain Earliest Deadline First (EDF) algorithm in detail. Also Explain MLF. **07**

**SECTION – II**

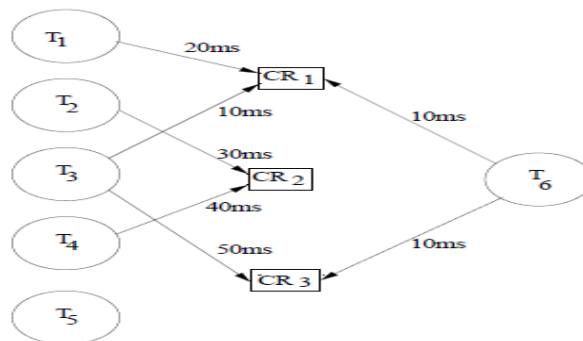
- Q-4 Attempt the Following questions** **07**
- a. Real-time processes are scheduled at higher priorities than the kernel processes in RTLinux. Justify.
- b. A separate queue is maintained for the waiting tasks for each critical resource in HLP. Justify.
- c. Can PIP and PCP be considered as greedy 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 arranged in decreasing order of their priorities. Compute the direct inversion of a task might have to undergo. **07**



- 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**

