Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2013

Subject code: 710105N **Date: 17-06-2013**

Subject Name: Real Time Computing

Time: 10.30 am – 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Define following terms w.r.t RTS. **07**
(i) Task (ii) Job (iii) Periodic Task (iv) Phase (v) Tardiness (vi) Sporadic task (vii) Optimal scheduler

(b) A system contains four periodic tasks. **07**
T1 (4, 1) T2(5, 1.8) T3(20, 1) T4(20, 2).
(i) Find suitable frame size for clock driven scheduling.
(ii) What is total utilization of system?

Q.2 **(a)** Discuss any seven selection criteria for real time kernels. **07**

(b) Seven jobs with their release time and absolute deadline are as follow. **07**
J1(2,10) J2(0,7) J3(1,12) J4(4,9) J5(1,8) J6(0,20) J7(6,21).
Dependencies among them are (J1, J2)->J3, J3->J4, J3->J5, (J4, J5)->J6, (J3,J4)->J7.
Draw precedence graph and find effective release time and effective deadline for all jobs.

OR

(b) Differentiate hard and soft real time system. Give one example of real life in each and justify why they are hard or soft RTS. **07**

Q.3 **(a)** A system contains three periodic tasks. **07**
T1 (5, 3) T2 (4, 2) T3 (20, 4).
Make schedule using RM in first hyper period and also indicate missing deadlines (if any).

(b) A system contains three periodic tasks. **07**
T1 (3, 2) T2 (4, 1) T3 (6, 4).
Make schedule using DM in interval [0, 20] and also indicate missing deadlines (if any).

OR

Q.3 **(a)** Three periodic tasks are given T1(5,5,5,10) T2(0,7,1,2) T3(0,13,2,5) **07**
(i) Find total utilization of system
(ii) Draw EDF schedule in internal [0,25]

(b) Explain LST scheduling algorithm with suitable example. **07**

Q.4 **(a)** Explain priority inheritance protocol with suitable example. **07**

(b) By the help of suitable example, explain following **07**
1. What is the effect of priority inversion while accessing common resource among multiple jobs?
2. How NPCS can control it?
3. What are pros and cons of NPCS?

OR

Q.4	**(a)**	Explain priority ceiling protocol with suitable example.	**07**
	(b)	How to find preemption ceiling of a given resource? Write scheduling rule, priority inheritance rule and allocation rule of preemption ceiling protocol.	**07**
Q.5	**(a)**	Explain state transition diagram of real time threads.	**07**
	(b)	Discuss any seven selection criteria for real time kernels.	**07**

OR

Q.5	**(a)**	Divide following real time systems into hard and soft RTS with proper justification. (i) Air traffic control system (ii) Automated car assembly plant (iii) Chemical plant control	**07**
	(b)	With suitable example explain how average response time of periodic jobs is improved in clock driven scheduling?	**07**

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