



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 110851

Roll No.

--	--	--	--	--	--	--	--	--	--

B. Tech.

(SEM. VIII) THEORY EXAMINATION, 2014-15

REAL TIME SYSTEM

Time : 3 Hours]

[Total Marks : 100

1 Attempt any four parts :

4×5=20

- (a) Explain various components of a typical real time system with block diagram.
- (b) Differentiate between hard and soft real time systems.
- (c) What are the traditional performance measures used for real time systems ?
- (d) What system considerations are required in designing real time systems ?
- (e) What do you understand by temporal constraints ? List possible task timing constraints.
- (f) Explain various application areas where real time systems are useful.

2 Attempt any four parts :

4×5=20

- (a) What is the difference between a performance constraint and a behavioral constraint in a real-time system ? Explain with the help of one example of each
- (b) Explain scheduling point of a task scheduling algorithm ? How the scheduling points are determined in (i) clock-driven system (ii) event-driven system ?
- (c) Can we consider EDF (Earliest-Deadline-First) as a dynamic priority scheduling algorithm for real-time tasks ? Justify your answer.
- (d) What are the distinguishing characteristics of periodic, aperiodic and sporadic real-time tasks ?
- (e) Determine whether the following set of periodic real-time tasks is schedulable on a uniprocessor using RMA (Rate Monotonic Algorithm).

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

3 Attempt any two parts :

2×10=20

- (a) Define Priority Inheritance Protocol (PIP) with its properties and show that PIP works as greedy algorithm.

- (b) Explain use of Priority-Ceiling Protocol in Dynamic Priority Systems. Why Round Robin Scheduling does not work for the real time application ?
- (c) How are deadlocks, unbounded priority inversions, and chain blocking prevented using PCP ?

4 Attempt any two parts : 2×10=20

- (a) What is the difference between hard and soft real-time communication supported by a network ? Distinguish traffic shaping and policing.
- (b) Describe any two traffic specification models which can satisfactorily be used to specify bursty traffic.
- (c) Define real time communication. Explain VTCSMA (Virtual Time Carrier Sensed Multiple Access protocol) with suitable example.

5 Attempt any two parts : 2×10=20

- (a) Discuss in detail which category of concurrency protocol is best suited under what circumstances ?
- (b) Given that a relative consistency set $R = \{\text{position, velocity, acceleration}\}$ and $R_{Tvi} = 100 \text{ ms}$, and the following data items: position = (25 m, 2500 ms, 200 ms), velocity = (300 m/s, 2550 ms, 300 ms), acceleration = (20 m/s², 2425 ms, 200 ms), current time = 2600 ms. Are given data items absolutely valid ? Also, are they relatively consistent ?

- (c) Explain any **two** of the following :
- (i) Commercial Real Time databases
 - (ii) Real Time Operating Systems
 - (iii) Temporal Consistency.
-