

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

PAPER ID : 2867

Roll No.

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**B. Tech.**

(SEM. VIII) THEORY EXAMINATION 2011-12

**REAL TIME SYSTEM**

Time : 3 Hours

Total Marks : 100

Note :- (1) Attempt all questions.

(2) All questions carry equal marks.

1. Attempt any **four** parts of the following :- (4×5=20)

- (a) What is a real time system ? Explain its various components with suitable block diagram.
- (b) Differentiate between Aperiodic and Sporadic jobs ? Explain the general strategy to handle Sporadic job.
- (c) What do you mean by temporal constraints ? List possible task timing constraints.
- (d) Discuss the important issues in real- time computing.
- (e) Explain why predictability is an important requirement of a real time system ? Discuss different techniques to enforce this requirement.
- (f) What is an embedded system ? Enumerate their types and why is embedded system RTOS to be scalable ?

2. Attempt any **two** parts of the following : **(2×10=20)**

(a) The periodic tasks (3, 1), (4, 2) and (6, 1) are scheduled according to the rate-monotonic algorithm.

(i) Draw the time-demand functions of the tasks.

(ii) Are the tasks schedulable ? Why or why not ?

(iii) Can this graph be used to determine whether the tasks are schedulable according to arbitrary priority-driven algorithms ? Explain.

(b) What do you mean by Priority driven scheduling of jobs ? Discuss difference between fixed priority and dynamic priority scheduling approach. Explain which one is more suitable for periodic tasks.

(c) Explain the algorithm EDF and LST with suitable example.

3. Attempt any **two** parts of the following : **(2×10=20)**

(a) Discuss basic Priority-Ceiling protocol and explain how it avoids deadlocks.

(b) Define priority-inheritance protocol with suitable example.

(c) Write short notes on the following :

(i) Sink Tree.

(ii) Resource conflict and blocking.

(iii) Greedy WRR discipline.

(iv) CAN.

4. Attempt any **two** parts of the following : **(2×10=20)**

(a) Describe VTCSMA (virtual time carrier-sensed multiple access) protocol using flowchart and further mention its important features along with its variants.

(b) What do you mean by dynamic scheduling and bandwidth preserving algorithms used in real time systems ? Discuss any one scheduling algorithm belonging to this paradigm for scheduling of periodic and aperiodic tasks.

(c) Differentiate between the following :

(i) Multiprocessor system and Distributed system.

(ii) RMFF and RMST algorithm.

(iii) Predictability and validation.

5. Attempt any **two** parts of the following : **(2×10=20)**

(a) Explain Resource Reservation Protocol (RSVP) Operations in detail.

(b) Discuss the most important issues in real-time software design. Explain how the principles of object oriented paradigm may be applied in large dynamic real-time systems.

(c) What are real-time database systems ? Draw the general model of real-time database system. What are real time transactions ? Why is temporal correctness criterion adhered determine correctness of a schedule ?