

Total No. of Questions : 12]

SEAT No. :

P803

[4659] - 216

[Total No. of Pages : 3

B.E.(Information Technology) (Semester - II)

REAL TIME SYSTEMS

(2008 Pattern) (Elective - III (a))

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answers to the two sections should be written in separate answer books.*
- 2) *Answer any three questions from each section.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right side indicate full marks.*
- 5) *Use of calculator is allowed.*
- 6) *Assume suitable data if necessary.*

SECTION - I

Q1) a) What is Hierarchical View of performance measure of RTS? In what way it is different than traditional Measure of performance? **[8]**

b) List down the types of performance measures for real-time systems. Which performance measures are the most appropriate for real-time systems? Why? **[8]**

OR

Q2) a) How can engineers estimate the worst-case run time of a program, given the source code and target architecture? Draw and explain Schematic of a timing estimation system. **[8]**

b) Explain different issues in real time computing. Draw block diagram for real time computer. Explain various characteristics of Real Time System. **[8]**

Q3) a) List down the suitable assumption for preemptive Earliest Deadline First Algorithm. In what way preemptive Earliest Deadline First Algorithm is different than Deadline Monotonic Algorithm. **[10]**

b) Describe the priority inheritance protocol. Give an example to show how this protocol can lead to deadlock. **[8]**

OR

Q4) a) Check whether the following set of periodic real time tasks is schedulable under RMA on a uniprocessor: $T_1 = (e_1 = 20, P_1 = 100)$, $T_2 = (e_2 = 30, P_2 = 150)$, $T_3 = (e_3 = 80, P_3 = 210)$, $T_4 = (e_4 = 100, P_4 = 400)$ **[10]**

P.T.O.

- i) Compute total CPU utilization.
 - ii) Necessary and sufficient condition for optimum scheduling.
 - iii) Time-Demand Analysis (Draw the graph between Time-Demand function and time.)
 - iv) Implement above system and find out total work load carry out.
- b) How are mode change implemented when the priority ceiling protocol is used to handle the access to critical section. [8]

- Q5)** a) Using example explains the different data typing features that could be useful in a real time programming language. [6]
- b) Describe the skeleton and optimistic algorithm under the two phase approach to improve predictability of real time transaction. [10]

OR

- Q6)** a) Explain how the two phase locking approach used in pessimistic concurrency control is disadvantage to real time system. How can it be modified to overcome the problem? [10]
- b) Using example explain the different data typing features that could be useful in a real time programming language. [6]

SECTION - II

- Q7)** a) Explain Virtual Time Carrier Sensed Multiple Access (VTCSMA) algorithms with flow chart. [4]
- b) Design Hierarchical round Robin protocol for link bandwidth 4 Mbps. Consider system of three classes with the following allocation. Draw the scheduler for Hierarchical Round Robin. [10]

Level i	n_i	b_i	FT_i	Slot b/w
1	4	1	4	1Mbps
2	4	1	16	250kbps
3	2	0	32	125kbps

- c) What is Timed Token protocol? How it is implemented. [4]

OR

- Q8)** a) Write a short notes on (Any Two) [10]
- i) Hard Real Time Databases
 - ii) Disk Scheduling Algorithms
 - iii) Maintaining serialization consistency

b) Discuss the various communication medium used in real time networking. [8]

Q9) a) Explain in detail timer function support system in RT Linux. [8]

b) Describe the following capability of real time operating system. [8]

i) External-Internal Interrupt Handling

ii) Memory management through virtual memory mapping and memory locking.

OR

Q10)a) Write short notes on the following mechanism present in real time operation system. [10]

i) Time Service

ii) Scheduling mechanism

b) Explain in detail capabilities of VX Works along with specific API for time services. [6]

Q11)a) How is hardware redundancy implemented through voting and consensus? Explain the working of formalized majority vote. [8]

b) Explain the Byzantines algorithm for fault tolerance with an example. Also specify the interactive consistency condition. [8]

OR

Q12)a) Explain briefly fault detection method using fault and error containment. [8]

b) Define the following term: [8]

i) Hardware fault

ii) Error latency

iii) Fault Latency

iv) Backward error require

