Total No. of Questions : 12]

SEAT No. :

P3418

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[4959]-193

B.E. (Information Technology)

a:REAL TIME SYSTEMS

(2008 Course) (Semester - II) (Elective - III) (414450) (Theory)

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

b) Describe in brief the effect of following in estimation of run time in a program. **[8]**

i) Source code
ii) Use of cache

OR

Q2) a) What are the various factors that are to be considered while estimating the program run-time in RTS? Describe analysis of source code, drive lower bounds and upper bounds with suitable example. **[8]**

b) Explain various characteristics of Real Time System. **[8]**

i) Time constraints

ii) Task Criticality

iii) Safety and Reliability

iv) Embedded

P.T.O.

Q3) a) Explain the classification of Real Time scheduling with example. **[6]**

b) Why Priority inversion mechanism is not suited for real-time applications. Write appropriate solution for this problem. **[8]**

c) State the assumption made for the implementation of the Rate Monotonic Scheduling algorithm. What is the easy schedulability test for this algorithm? **[4]**

OR

Q4) a) Consider : Task 1= (p1, e1) = (2,0.9) **[8]**

Task 2 = (p2, e2) = (5, 2.3)

i) Find total processor utilization

ii) Find necessary and sufficient condition

b) How are mode change implemented when the priority ceiling protocol is used to handle the access to critical section. **[6]**

c) Explain Given an algorithm to scheduling tasks that have precedence constraints. **[4]**

Q5) a) How are timestamps assigned to transaction so that serialization consistency is maintained? Explain with suitable example. **[6]**

b) Describe the Adaptive Earliest Deadline (AED) algorithms used in transaction priorities. State the drawback of AED algorithm. How the Adaptive Earliest Deadline (AEVD) avoid this drawback. **[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. **[8]**

b) Consider VTCSMA-L. Support the packets arrive according to the following table. **[10]**

Node	M	RC at Arrival	Dm	Lm
1	1	0	32	16
2	2	10	36	20
3	3	20	56	40
4	4	20	72	60

Let us assume that for each packet is Tm = 15, Propagation time t = 1.

Draw the trajectory for n = 2

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) Draw the functionality block diagram of real time operating system. **[4]**

b) Explain the difference between Soft Real Time System and Hard Real Time System. **[4]**

c) 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) With the help of block diagram explain the capability of RT Linux. **[6]**

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

b) Write short notes on (Any Two) **[8]**

i) Time Redundancy

ii) Information Redundancy

iii) Data Diversity

OR

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

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