

Total No. of Questions : 12]

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SEAT No. :

P880

[Total No. of Pages : 3

[4264] - 723

B.E. (Information Technology)

REAL TIME SYSTEM

(2008 Pattern) (Elective - III) (Semester - II)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) Answer three questions from Section - I and three questions from Section - II.
- 2) Answers to the two sections should be written in separate answer books.
- 3) Neat diagrams should be drawn wherever necessary.
- 4) Assume suitable data, if necessary.

**SECTION - I**

- Q1)** a) Describe the classification of real time system with suitable example. What are the issue in real time computing. [8]
- b) Consider a traffic light control system. A traffic light will be normally green for G second, yellow for Y second and red for R second. During night for certain period of time the intersection will automatically suspend normal service and its will flash yellow. Consider intersection two - two way street. [8]
- i) Find accomplishment level.
  - ii) Find hierarchical view performance.

OR

- Q2)** a) What are the various factor, that are to be consider while estimating the program ran time in real time system. Describe analysis of source code, drive lower bounds and upper bounds for suitable example. [10]
- b) What is performability ? Explain with suitable example. In what way it is different then traditional measure of performance. [6]
- Q3)** a) Explain the classification of uniprocessor scheduling algorithm. With the help of suitable example explain the RM scheduling algorithm. [10]
- b) Describe the priority inheritance protocol. What is the advantage of this protocol over the priority inheritance protocol? [8]

OR

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- Q4) a) State the assumptions made for implementation of Deadline Monotonic Algorithm (DMA). [6]
- b) Is the following task set schedulable by DMA? Also check whether it is schedulable using RMA. [6]
- $T_1 = (e_1 = 10 \text{ m sec}, P_1 = 50 \text{ m sec}, d_1 = 35 \text{ m sec}),$   
 $T_2 = (e_2 = 15 \text{ m sec}, P_2 = 100 \text{ m sec}, d_2 = 20 \text{ m sec}),$   
 $T_3 = (e_3 = 20 \text{ m sec}, P_3 = 200 \text{ m sec}, d_3 = 200 \text{ m sec}),$
- c) How does the ceiling priority protocol overcome the problem of deadlock that occurs due to priority inheritance. [6]

- Q5) a) Describe the Adaptive Earliest Deadline (AED) algorithm used in transaction priorities. [6]
- b) Explain use of POSIX programming API in Real Time system. With any eight API. [10]

OR

- Q6) a) State the major disadvantage of the two phase locking approach used in pessimistic concurrency control. How can this approach be modified to resolve this problem. [8]
- b) Describe the skeleton and optimistic algorithm under the two phase approach to improve predictability of a real time transaction. [8]

## SECTION - II

- Q7) a) Explain the VTCSMA protocol using a suitable example. Draw the VCRC trajectory for this example for  $n = 2$  and  $n = 4$ . Discuss the performance of this algorithm. [10]
- b) Describe the timed token protocol. Why this protocol is attractive for RTS. [8]

OR

- Q8) a) Explain the window protocol used in broadcast network with a suitable example. Does it give deadline guarantees? Why/ why not? [8]
- b) What is the called Bus protocol? How it is implemented? [6]
- c) Describe the stop and Go Multihop Protocol. [4]



**Q9) a)** Write short notes on the following mechanisms present in a real time operating system. [10]

- i) Time services.
- ii) Scheduling mechanisms.

**b)** State the commonly found features of commercial real time operating system. [6]

OR

**Q10) a)** Discuss with block diagram the real time extension of Linux Operating System. [8]

**b)** Write short notes on : [8]

- i) QNX/Neutrino
- ii) VRTX

**Q11)** Draw UML diagram for alarm clock interface. Expected Design level requirement like this. [16]

- a) Purpose - 24 hour digital with one alarm.
- b) Input - Set time, Set alarm, hour, minute, alarm on/off.
- c) Output - Four digit display, PM indicator, alarm ready, buzzer.
- d) Function - Keep time, Set time, Set alarm, turn alarm on/off, activate buzzer by alarm.

OR

**Q12) a)** Explain the procedure used to implementation of Time Redundancy for Backward Error Recovery. Why check pointing is expensive in memory and time. How it be modified to over come the problem. [8]

**b)** Describe the 3 types of voters in cases where an approximate agreement is required to achieve hardware redundancy through voting and consensus. [8]

