Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/M.Tech (CSE)/SEM-1/MCSE-102/2009-10
2009
DISTRIBUTED REAL TIME OPERATING SYSTEMS

Time Allotted : 3 Hours   Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Objective Type Questions)

1. Answer the following :   10 × 1 = 10

    A. Choose the correct alternatives for the following :

        i)   Type of performance and behavioural constraint is

            a)   delay constraint

            b)   deadline constraint

            c)   duration constraint

            d)   all of these.

        ii) For real-time communication in LAN, which of the following architectures is used ?

            a)   Bus   b)   Ring

            c)   Token bus   d)   None of these.

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iii) Jitter is due to

    a)   large number of packets in the net

    b)   long packet size

    c)   variation in the delay encountered by the packets

    d)   long delay encountered by the packets.

B.   Fill in the blanks of the following :

iv)   Scheduling refers to a set of .... & .... to control the order to work to be performed by a computer system.

v)   .... scheduling policy forces currently active process to release the CPU on certain events such as clock interrupts, system call etc.

C.   State whether the following assertions are *True* or *False*. Write one or two sentences to justify your choice in each case.

vi)   A system is called a real-time system, when we need qualitative expression of time to describe the behaviour of the system.

vii)   Average response time is an important performance metric for RTOS handling running of hard real-time tasks.

viii)   Unlike table-driven schedulers, cyclic schedulers do not require to store a pre-computed schedule.

ix)   When RMA is used for scheduling a set of hard real-time periodic tasks, the upper bound on achievable utilization improves as the number in tasks in the system being developed increases.

x)   A time-sliced round-robin scheduler uses pre-emptive scheduling.

GROUP – B
(Short Answer Type Questions)
Answer any *three* of the following.   3 × 5 = 15

2. Explain the parameters on which the service quality expected by an application from the underlying network is often expressed.

3. What are the problems faced in adaptive traffic smoothing in comparison to fixed rate traffic smoothing ? How are those issues resolved ?

4. Draw the model of basic real time system and explain its block.

5. What are the different types of real-time systems ? Give examples.

6. Compare clock driven and event driven schedulers.

GROUP – C
(Long Answer Type Questions)
Answer any *three* of the following.   3 × 15 = 45

7. a) Explain any two global priority arbitration based protocols with examples.   6 + 6

    b) Explain with an example why jitter is taken as one of the parameters to calculate the required buffer size at the receiver.   3

8. a) As far as 'work conserving service discipline' is concerned, in between 'multilevel FCFS queue' and 'WFQ', which one is a better approach and why ?   4
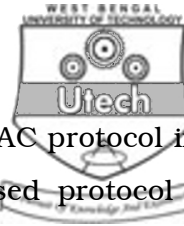
b) What are the major responsibilities of MAC protocol in a LAN ? Why do the most commonly used protocol for access control in traditional bus networks fail for real time communication ? Why is "logical ring" better approach as far as real time communications are concerned ? Again, how are the problems of the ring architecture solved to arrive at a satisfactory solution ? 7

c) How does OCC protocol control concurrency in real-time databases ? 4

9. Explain the different types of scheduling techniques in a uniprocessor with proper example.

10. Check the following periodic tasks for schedulability under RMA on a uniprocessor $T1 : (e1 = 0$ ms, $p1 = 100$ ms), $T2 : (e2 = 30$ ms, $p2 = 150$ ms), $T3: (e3 = 100$ ms, $p3 = 250$ ms). with proper mathematical proof.

11. Write short notes on any *three* of the following : 3 × 5

a) Characteristics of Real Time System

b) Types of Real Time System with example

c) Comparison of different Real Time tasks

d) Comparison of different types of Real Time task schedulings.