Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(CSE)/SEM-7/CS-704D/2009-10

2009

ADVANCED OPERATING SYSTEM

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

(Multiple Choice Type Questions)

1. Choose the correct alternatives of the following : $10 \times 1 = 10$

   i) In the P-out-of-Q request model of deadlock, if $P = Q$ and $P = 1$ then it becomes

      a) AND-OR

      b) OR and AND

      c) AND and OR

      d) all of these models respectively

   ii) *Statement* 1 : Lamport's algorithm achieves mutual exclusion.

      Statement 2 : Maekawa algorithm does not achieve mutual exclusion.

      Which of the above statements are correct ?

      a) Statement 1

      b) Statement 2

      c) Both Statement 1 and Statement 2

      d) None of these.

iii) A token based algorithm is used for

a) distributed deadlock

b) distributed mutual exclusion

c) distributed scheduling

d) distributed deadlock detection.

iv) Rollback of a process is a method for deadlock

a) avoidance b) detection

c) prevention d) recovery.

v) Suppose, in a distributive system has n no. of processes. Then total no. of messages per entry / exit required in the distributive approach for mutual exclusion is

a) $2(n-1)$ b) 3

c) $n-1$ d) infinity.

vi) A prefix table contains

a) the destination

b) the hop count reach to the network

c) token

d) all of these.

vii) Which of the following is used to implement naming service in distributed system where object migration is not supported ?

a) Broadcasting b) Static map

c) Token d) All of these.

viii) The primary goal of distributed file system is

a) network transparency

b) location transparency

c) lamport transparency

d) all of these.

ix) The alternative command is associated with

a) synchronization

b) failure handling

c) monitor

d) communicating sequential processes.

x) Proof by property is an approach of

a) confidentiality b) authentication

c) integrity d) non-repudiation.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Briefly describe the Lamport's logical clock. What are its limitations ? 3 + 2

3. What are the advantages of user level thread and kernel level thread ? $2 \times 2\frac{1}{2}$

4. Briefly explain the different kinds of transparency properties desirable in a distributed system.

5. Differentiate between monitor and semaphore. Discuss the types of semaphore. 2 + 3

6. Discuss the differences between network operating system and distributed operating system.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. What is deadlock ? Write down the differences between deadlock and starvation. Explain the different models of deadlock. Describe any one distributed deadlock detection algorithm. 1 + 2 + 6 + 6

8. What is cryptography ? What are internal and external security ? Write down the general structure of a cryptographic system. Name the different types of cryptographic system. Write down the difference between virus and worm. Briefly describe digital signature. 1 + 3 + 3 + 2 + 3 + 3

9. a) What are partial ordering and total ordering in a distributed operating system ?
   b) Briefly discuss about Lamport's logical clock with an example.
   c) What are the limitations of Lamport's logical clock ?
   d) What do you mean by a happened-before relation ? What conditions should happened-before relations satisfy ? 2 + 6 + 2 + 5

10. a) Discuss how process migration is done in a distributed system.
    b) Explain briefly the concept of RPC.
    c) What do you mean by stateless and stateful servers ? 6 + 6 + 3

11. Write short notes on any *three* of the following : 3 × 5
    a) Communicating Sequential Process (CSP)
    b) Message Passing System
    c) Hypercube Architecture
    d) Distributed file system.