Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH(IT)/SEM-7/IT-703D/2011-12

2011

DISTRIBUTED COMPUTING

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 for the following :

$10 \times 1 = 10$

i) Processes in distributed system normally communicate by using

a) Shared data approach

b) Message-Passing approach

c) Both of these

d) None of these.

ii) Cross-domain is associated with

a) RPC b) LRPC

c) WRPC d) none of these.

iii) What is used to detect deadlock in distributed system ?

a) Chandy-Misra-Hass algorithm

b) Active Time Server Algorithm

c) Ring Algorithm

d) Lamport Algorithm.

iv) Two events are said to be ..... if they are not related by the happened before relation.

a) transitive b) concurrent

c) causal d) none of these.

v) Light weight RPC is made for

a) cross-domain communication

b) cross-machine communication

c) both (a) and (b)

d) none of these.

vi) Two events are said to be ..... if they are not related by the happened before relation.

a) Concurrent b) Causal

c) Transitive d) Parallel.

vii) Non-blocking synchronization is implemented by using the technique

a) polling b) interrupt

c) both (a) and (b) d) none of these.

viii) Process migration is advantageous because

a) it reduces average response time

b) utilizes resource effectively

c) reduces network traffic

d) all of these.

ix) UTC stands for

a) Universal Time for Communication

b) Coordinal Universal Time

c) Unique Time for Communication

d) None of these.

x) Granularity refers to distributed shared memory in terms of

a) block size b) page size

c) virtual address space d) logical address space.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. a) What are the four necessary conditions for a deadlock to occur ? 2

b) Prove that the presence of a cycle in a general resource allocation graph is a necessary but not a sufficient condition for the existence of deadlock. 3

3. What are the advantages and disadvantages of using the concept of Lamport's logical clock ?

4. a) What do you mean by Thrashing ? 2

b) Explain the relationship between thrashing and granularity. 3

5. a) Briefly describe symmetric and asymmetric key cryptography. $2\frac{1}{2}$

b) Briefly describe Zero capacity buffer and bounded capacity buffer in message passing system. $2\frac{1}{2}$

6. Describe the token passing approach of achieving mutual exclusion.

GROUP – C

(Long Answer Type Questions)

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

7. a) What are the main differences between a network operating system and a distributed operating system ? 5

   b) What do you understand by transparency with reference to distributed systems ? Explain briefly the different types of transparencies. 5

   c) What are the different degrees of reliability in multicast communication ? Explain with an example of an application for each type. 5

8. a) Explain what is meant by absolute ordering, consistent ordering and causal ordering of messages. Give a mechanism to implement each one. 9

   b) What is "thrashing" ? Give some methods to solve the thrashing problem in distributed shared memory systems. 4

   c) What are multidatagram messages ? 2

9. a) Describe blocking and non-blocking types of IPC. 3

b) What are the relative advantages and disadvantages of blocking and non-blocking IPC ? 3

c) What do you mean by LWRPC ? 2

d) What is masquerading. 2

e) Describe some techniques used in LWRPC system that makes it more efficient than the conventional RPC system. 5

10. a) Name the main components of a distributed file system. What might be the reasons for separating the various functions of a distributed file system into these components ? 1 + 3

b) "In the design of a distributed file system, high availability and high scalability are mutually related properties." Discuss. 3

c) "In the design of a distributed file system, high performance and high reliability are mutually related properties." Discuss. 3

d) What is an immutable file ? Can a file system be designed to function correctly by using only immutable files ? Explain. 2 + 3

11. a) What is name server ? Differentiate between system oriented and human oriented names. 2 + 3

b) What is drifting of clocks ? What is clock skew ? 3 + 2

c) In case of centralized clock synchronization algorithms, what is the difference between active time server and passive time server algorithms ? 5

12. a) What is Name Space ? Differentiate between Flat Name Space and Partitioned Name Space. What are the tasks of a Name Server ? 8

b) What are the desirable features of a distributed file system ? What are the differences between replication and caching ? 7