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Invigilator's Signature :	

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.

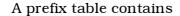
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- iii) A token based algorithm is used for
 - a) distributed deadlock
 - b) distributed mutual exclusion
 - c) distributed scheduling
 - d) distributed deadlock detection.
- iv) Rollback of a process is a method for deadlock
 - a) avoidance
- b) detection
- 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.





- b) the hop count reach to the network
- c) token
- d) all of these.

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

- a) Broadcasting
- b) Static map

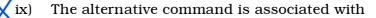
c) Token

d) All of these.

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viii) The primary goal of distributed file system is

- a) network transparency
- b) location transparency
- c) lamport transparency
- d) all of these.



- 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

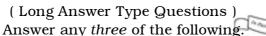
(Short Answer Type Questions)

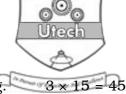
Answer any *three* of the following. $3 \times 5 = 15$

- 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 ? $2\times2\frac{1}{2}$
- 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.

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GROUP - C





- 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.

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