

[Total No. of Questions: 12]

[Total No. of Printed Pages :2]

UNIVERSITY OF PUNE

[4364]-801

B. E. (Information Technology)

Examination - 2013

DISTRIBUTED SYSTEM

(2008 Pattern)

[Time : 3 Hours]

[Max. Marks : 100]

Instructions :

- (1) *Answers Question 1 or 2, 3 or 4 and 5 or 6 from section I and Question 7 or 8, 9 or 10 and 11 or 12*
 - (2) *Answers to the **two sections** should be written in **separate answer-books**.*
 - (3) *Neat diagrams must be drawn whenever necessary.*
 - (4) *Figures to the right indicate full marks.*
 - (5) *Assume suitable data, if necessary.*
-

SECTION I

- | | | | |
|-----------|---|--|----|
| 1 | A | Describe architecture model of the Distributed System design. How these models play important roles in the design of a Distributed System. | 8 |
| | B | When a Distributed System can be considered as an Open Distributed System? Mention benefits provided by an Open System. | 8 |
| OR | | | |
| 2 | A | Describe the working of Distributed System based upon middleware software systems. Also clearly describe the roles played by middleware in Distributed System. | 8 |
| | B | List out different types of transparencies associated in a Distributed System. Compare Distributed Operating System with Network Operating System in terms of transparencies associated. | 8 |
| 3 | A | Define Remote Object. Explain Distributed Objects with working of client side proxy and server side skeleton to provide remote access to methods of an object. | 8 |
| | B | What is marshalling? How marshalling and serialization is used in communication between a client and a server? | 8 |
| OR | | | |
| 4 | A | Explain working of Remote Procedure Call with neat diagram showing various RPC components and their interactions with each other. | 8 |
| | B | How Lightweight Remote Procedure Call technology is used to provided communication between domains in a single machine. What are the basic feature of LRPC? | 8 |
| 5 | A | Why should time be synchronized in a Distributed System? How network Time | 10 |

Protocol (NTP) work to synchronize the clocks of computers in internet? Compare clock synchronization in centralized and Distributed Systems

- B Discuss happens-before relationship in a set of events occur in various processes. How happens-before relationship is used in Lamport's logical clock synchronization? 8

OR

- 6 A Explain the working of coordinator selection algorithm. How Bully and Ring algorithms are used to handle the workload after crash of the current coordinator in Distributed System. 10

- B Explain centralized and distributed algorithms used to achieve mutual exclusion. 8

SECTION II

- 7 A How does Distributed File System differ from a file system used for a centralized time sharing system? 8

- B Describe Sun NFS with its architecture and components for Unix system with the help of neat diagram. 8

OR

- 8 A How does client side caching is used in NFS? Discuss the role of RPC in NFS. 8

- B Discuss the issues of improving availability of files in a Distributed File System. Describe various methods of replica creation in Distributed File System. (You can consider NFS as an example DFS.) 8

- 9 A Describe Distributed Shared Memory system with placement of various components in its architecture representation. 8

- B Discuss how the efficiency of Distributed Shared Memory system depends on the size of granularity and protocol used for page replacement. 8

OR

- 10 A Explain consistency models used in the Distributed Shared Memory system. 8

- B Message passing is used as a communication mechanism in Distributed System, Compare programming issues of Distributed Shared Memory system with message passing approach. 8

- 11 A Explain following points related to fault tolerance issues in distributed systems: 10

1. Availability
2. Reliability
3. Failure models
4. Triple Modular Redundancy

- B How check pointing is used in fault tolerance in Distributed Systems? Explain independent check pointing and coordinated check pointing. 8

OR

- 12 A Explain following points related to recovery for providing fault tolerance capacities: 10

1. Backward recovery
2. Forward recovery
3. Sender based logging
4. Receive based logging
5. Stable storage

- B How failure masking is used to provide fault tolerance capability in distributed system? 8

