



(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 110701**

Roll No.

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**B. Tech.**

(SEM. VII) (ODD SEM.) THEORY  
EXAMINATION, 2014-15

**DISTRIBUTED SYSTEMS**

Time : 3 Hours]

[Total Marks : 100

**Note : Attempt all questions**

1 Attempt any four parts :

4×5=20

- (a) What is a distributed system? Describe the main characteristics of distributed systems. Give two examples of distributed system.
- (b) What are commit protocols? Explain how two-phase protocols respond to failure of participating site and failure of co-ordinator.
- (c) What do you mean by mutual exclusion in distributed system? What are requirements of a good mutual exclusion algorithm?

- (d) What are Vector clocks? Explain with the help of implementation rule of vector clocks, how they are implemented ? Give the advantages of Vector clock over Lamport clock.
- (e) What is Replication and replica manager? Give the architectural model for replicated data.
- (f) What is distributed shared memory (DSM)? Explain with diagram the architecture of distributed shared memory.

2 Attempt any four parts : 4×5=20

- (a) Explain the following :
- (i) Gossip architecture
  - (ii) Quorum consensus methods
- (b) What do you mean by recovery in concurrent systems? Explain.
- (c) What is Voting protocol? Explain Static voting and Dynamic voting protocols.
- (d) Explain the Ricart-Agrawala algorithm for mutual exclusion. Mention the performance of this algorithm.
- (e) Define fault and failure. What are different approaches to fault-tolerance? Explain.
- (f) Describe the following algorithm for implementing DSM :
- (i) The Migration Algorithm
  - (ii) The Full-Replication Algorithm

3 Attempt any two parts : 10×2=20

- (a) (i) What are the goals of distributed transaction? Distinguish between Flat and Nested Transaction along with its structure.
- (ii) Explain optimistic concurrency control.
- (b) Define forward recovery and backward recovery. List advantages and disadvantages of forward recovery. Explain two approaches of backward-error recovery.
- (c) What are agreement protocols? Explain Byzantine agreement problem, the consensus problem and interactive consistency problem. Describe Lamport-shostak-pease algorithm.

4 Attempt any two parts : 10×2=20

- (a) What are the advantages and drawback of multiversion timestamp ordering in comparison with the basic timestamp ordering ?
- (b) Write short note on :
- (i) Livelocks
  - (ii) Domino effects
  - (iii) Failure resilient processes
  - (iv) Consistent Checkpoints
- (c) (i) Explain typical architecture of distributed file system. Give the mechanisms for building distributed file system.
- (ii) What is caching? How is useful in DFS?

5 Attempt any two parts :

10×2=20

- (a) Give the deadlock handling strategies in distributed systems? What are the differences in centralized, distributed and hierarchical control organizations for distributed deadlock detection?
  - (b) Why is scalability an important feature in the design of distributed system? Discuss some of the guiding principles for designing a scalable distributed system.
  - (c) Distinguish between :
    - (i) Resource deadlock and Communication deadlock.
    - (ii) Token based and non-token based algorithm.
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