

## C12-R3: DISTRIBUTED SYSTEMS

### NOTE:

1. Answer question 1 and any FOUR from questions 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

Time: 3 Hours

Total Marks: 100

1.
  - a) What are the services offered by operating system to implement distributed system in a multicomputer architecture?
  - b) In computer hardware, shared memory refers to a large block of random access memory that can be accessed by several different CPUs in a multiple-processor computer system. What are the issues in designing a Shared memory system?
  - c) What are the differences between CORBA and RMI?
  - d) Where can Release Consistency model be implemented? Name the protocols that implement Release Consistency.
  - e) X.500 is a series of computer networking standards covering electronic directory services. What are the protocols included in X.500?
  - f) What is optimistic Concurrency control? What are the phases of it?
  - g) Explain the term "Concurrency Transparency" in a distributed environment.

**(7x4)**
  
2.
  - a) Remote Procedure Call (RPC) is an Inter-process communication technology that allows a computer program to cause a subroutine or procedure to execute in another address space without having to understand network details. Explain the steps carried in Remote Procedure call.
  - b) What are the key issues to design distributed file system?
  - c) Why is the file caching scheme needed? Describe in brief the design issues in file caching scheme.

**(7+6+5)**
  
3.
  - a) The Domain Name System (DNS) is a hierarchical naming system for computers, services, or any resource connected to the network. Show step by step address resolution process in DNS.
  - b) Digital signature is an electronic signature that can be used to authenticate the identity of the sender of a message or a document. How does digital signature work?
  - c) An atomic commit is an operation in which a set of distinct changes is applied as a single operation. What are the basic steps for two-phase commit protocol? Mention advantages and disadvantages of it.

**(5+5+8)**
  
4.
  - a) What are the advantages and disadvantages of client-server architecture in the distributed computing?
  - b) What are the various services offered by middleware system?
  - c) What are the different strategies of security mechanisms for a distributed system?

**(6+6+6)**

**5.**

- a) What are the four conditions which are to be met for a deadlock to occur in a system?
- b) Explain in brief various strategies for dealing with distributed deadlocks.
- c) Explain briefly the centralized deadlock detection in Distributed system.

**(6+6+6)**

**6.**

- a) Distributed Computing Environment (DCE) is software system that supplies a framework and toolkit for developing client/server applications. What are the framework components of DCE?
- b) List and describe types of failures which can occur in distributed system.
- c) What are the reasons for migrating code in the design of a distributed system? Mention different models for code migration

**(6+6+6)**

**7.**

- a) Cryptography is the process of converting ordinary information (plaintext) into unintelligible form. What are the symmetric-key and asymmetric-key cryptography?
- b) What are the challenges in designing of a distributed shared memory?
- c) Interoperability among resources is required in a distributed system. What kind of levels of compatibility can be implemented in the distributed system?

**(8+6+4)**