Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1720201 **Date: 06/07/2012**

Subject Name: Distributed Operating Systems

Time: 10:30 am – 13:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Why is scalability an important feature in the design of a distributed system? Discuss some of the guiding principles for designing a scalable distributed system. **04**

(b) Discuss relative advantages and disadvantages of monolithic kernel and microkernel approaches for designing a distributed operating system. **03**

(c) What is callback RPC facility? Give an example of an application where this facility may be useful. What are the main issues involved in supporting this facility in an RPC system? Describe a mechanism to handle each of these issues. **07**

Q.2 **(a)** The operations performed by a server are non-idempotent. Describe a mechanism for implementing exactly-once IPC semantics in this case. **04**

(b) What are the main advantages of an RPC system that allows the binding between a client and a server to change dynamically? What are the main issues involved in providing the flexibility? **03**

(c) Describe a mechanism for implementing consistent ordering of messages in each of the following cases: **07**

i.) One-to-many communication
ii.) Many-to-one communication
iii.) Many-to-many communication

OR

(c) Normally when message is transferred from sending site, each layer adds its own header to the message being transmitted across the network. Instead of adding a separate header at each layer, it would have been more efficient to add a single header containing the control information in all these headers to the message before its transmission across the network. Explain why this is not done. **07**

Q.3 **(a)** Give three different methods that may be used in ATM networks to allocate bandwidth to applications to make best use of the available bandwidth while satisfying the requests of the applications. Also give the relative advantages and limitations of the three methods. **04**

(b) Why most computer networks use fewer layers than those specifies in the OSI model? **03**

(c) What are the main causes of thrashing in a Distributed Shared Memory system? What are the commonly used methods to solve the trashing problem in a DSM system? **07**

OR

Q.3 **(a)** What are some of the issues involved in building a DSM system on a network of heterogeneous machines? Suggest suitable methods for handling these issues. **07**

(b) Describe distributed approach for implementing mutual exclusion in **07**

distributed systems.

Q.4	**(a)**	What is a phantom deadlock? What might be the reason for phantom deadlocks in a distributed system? Suppose in the centralized deadlock detection scheme the transfer-on-request method is used to transfer information from local coordinators to the central coordinators. Give an example to show that the algorithm may still detect a phantom deadlock.	**07**
	(b)	Discuss desirable features of a good global scheduling algorithm.	**07**

OR

Q.4	**(a)**	An important issue in clock synchronization in computer systems is that time must never run backward. Give two examples to show why this issue is important. How can a fast clock be readjusted to take care of this issue?	**04**
	(b)	What are the differences between replication and caching?	**03**
	(c)	Why election algorithms are normally needed in a distributed system? A LAN-based distributed system has broadcast facility. Suggest a simple election algorithm for use in this system.	**07**

Q.5	**(a)**	Discuss Message-Forwarding Mechanism in process migration.	**07**
	(b)	Describe how file management is done in Amoeba distributed operating system.	**07**

OR

Q.5	**(a)**	Discuss two most commonly used file modeling criteria, used in different file systems.	**07**
	(b)	Discuss system architecture and describe features of CHORUS distributed operating system.	**07**

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