Printed Pages : 4 **TCS – 801 / TIT – 801**

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

PAPER ID : 0147/0192 Roll No.

B. Tech.

(SEM. VIII) EXAMINATION, 2007-08

DISTRIBUTED SYSTEMS

Time : 3 Hours] *[Total Marks : 100*

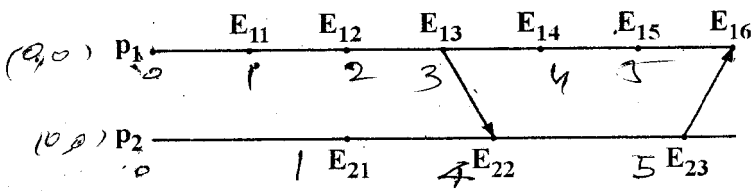
Note : *(1) Attempt **all** questions.*
*(2) **All** questions carry **equal** marks.*

1 Attempt any **four** parts of the following :

(a) What are Distributed System ? Explain its challenges in brief.

(b) What are logical clocks ? Why does a logical clock need to be implemented in Distributed System? Explain with an example, what are the impacts of absence of global clock and shared memory.

(c) Consider the following space time diagram for two processes P_1 and P_2.



Obtain the Lamport time stamp for each event. List the events which casually affect the event E_{22}.

(d) What do you mean by Casual Ordering of messages ? Discuss the salient features of Broadcast based protocol that make the uses of Vector clock which ensures Causual Ordering of messages.

(e) What do you mean by problem of mutual exclusion in Distributed System? What are the requirements of a good mutual exclusion algorithm? How does the performance of a Distributed algorithm ?

(f) What are the Token and Non-token based algorithm ? Explain Lamport's algorithm with example.

2 Attempt any **two** of the following :

(a) (i) Explain the deadlock handling strategies in distributed system.

(ii) Explalin the control organization for Distributed deadlock detection.

(b) A centralized global deadlock detector holds the union of local wait-for graphs. Give an example to explain how a phantom deadlock could be detected if a waiting transaction in a deadlock cycle abort during the deadlock detection procedure.

(c) (i) What are the shortcomings of Ramamoorthy's two phase algorithm for deadlock detection ?

(ii) Show that Byzantim agreement cannot always be reached among four processors if two processors are faulty.

3 Attempt any **two** of the following :

(a) What are the communication models proposed for the distributed objects? Explain the concept of remote method invocation with a suitable example.

(b) Discuss how a public key scheme can be used to solve the key distribution problem in a private key cryptographic scheme.

(c) Which features of the AFS design make it more scalable than NFS ? What are the limits on its scalability, assuming that servers can be added as required ?

4 Attempt any **two** of the following :

(a) The two-phase commit protocol is a centralized protocol where the decision to abort or commit is taken by the co-ordinator. Design a decentralized two-phase commit protocol where no site is designated to be a co-ordinator.

(b) Describe how a non-recoverable situation could arise if write locks are released after the last operation of a transaction but before its commitment.

(c) Explain how the two-phase commit protocol for nested transaction ensures that if the top-level transaction commits all the right descendents are committed or aborted.

5 Attempt any **two** of

(a) What are Wave and Traversal algorithms? Discuss the usage and application of wave algorithms. Give any three requirements satisfied by wave algorithm.

(b) What do you mean by Routing? Discuss the Correctness, Complexity, Efficiency and Robustness criteria of a good routing algorithm.

(c) Write short notes on :

(i) CORBA Services

(ii) Election algorithm

(iii) Balanced Sliding Window protocol.