		(3 hrs)		**Marks: 80**

N.B. (1) Question one is Compulsory.
     (2) Attempt any 3 questions out of the remaining.
     (3) Assume suitable data if required.

Q1. a) What are various issues of distributed system?   05

     b) Suppose through experimentation it was verified that 70% of execution was   05
spent on parallelizable execution. What are the maximum speedup and
efficiency those can be achieved with 8 processors?

     c) Justify how Ricart-Agrawala's algorithm optimized the Message overhead in   05
achieving mutual exclusion.

     d) Give examples for the following message communication models   05
- Transient Synchronous
- Response based synchronous communication
- Transient asynchronous
- Persistent Asynchronous
- Receipt based communications

Q2. a) Brief the different load estimation policies and process transfer policies used by   10
Load balancing algorithm.

     b) Discuss the Structural and Data hazards in Pipeline architecture. Discuss any
one technique to control / mitigate them in detail.   10

Q3. a) Design and analyze 3-stage pipeline operations executing the following task: 10
Xn + Yn * Zn, for n = 1, 2, 3,…, 7.

     b) Describe any one method of Logical Clock synchronization.   10

Q4 a) Clearly explain how Monotonic Read consistency model is different from Read   10
your Write Consistency model. Support your answer with suitable example
application scenarios where each of them can be distinctly used.

     b) Discuss the need for process migration and the role of resource to process and   10
process to resource binding in process migration

Q5 a) Apply quicksort parallel algorithm for the following example: 10
16, 08, 33, 45, 25, 19, 53, 06

     b) Differentiate between Distributed OS, Network OS and Middleware based OS   10

Q6 Write a note on **any two** of the following   20

     a) Hadoop Distributed File System
     b) Systolic Architecture
     c) RPC and RMI

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