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- N.B:** 1) Question **number 1** is compulsory.
2) Attempt **any THREE** out of the remaining.
3) Assume suitable data if **necessary** and justify the assumptions.
4) Figures to the **right** indicate full marks.

Q 1

- A Explain key Features of Global Scheduling algorithm. [05]
- B What are the services offered by middleware? [05]
- C Differentiate between RMI and RPC. [05]
- D Explain synchronization in DFS with its challenges. [05]

Q 2

- A Justify how load balancing is useful in distributed system. [10]
- B What is fault tolerance? Explain failure models. [10]

Q 3

- A Explain group communication. [10]
- B Explain Raymond's tree based algorithm for mutual exclusion. [10]

Q 4

- A Explain Ricart-Agrawala's algorithm and how it optimizes the message overhead in achieving mutual exclusion. [10]
- B Discuss Google file system (GFS) as a scalable distributed file system. [10]

Q 5

- A Explain bully election algorithm. [10]
- B Discuss code migration in distributed system. [10]

Q 6

- A Explain any five data centric consistency models. [10]
- B Discuss design issues in distributed systems. [10]

Duration: 3Hrs

[Max Marks: 80]

N.B.: (1) Attempt any four questions

(2) All questions carry equal marks

(3) Assume suitable data, if required and state it clearly

- Q1** A Explain any five data centric consistency models with example data stores. [10]
B Explain different load estimation policies and process transfer policies used in load balancing approach of distributed system. [10]
- Q2** A What is Remote Procedure Call? Describe the working of RPC in detail. [10]
B Explain Bully election algorithm. [10]
- Q3** A Discuss design and implementation issues of distributed shared memory. [10]
B What are desirable features of a good DFS? [10]
- Q4** A Discuss various issues and goals related to design of distributed system. [10]
B What is distributed mutual exclusion? Explain how Suzuki-Kasami's broadcast algorithm achieves distributed mutual exclusion. [10]
- Q5** A What is need of code migration? Explain the role of process to resource and resource to machine binding in code migration. [10]
B Explain various file caching schemes. [10]
- Q6** A What is physical clock? Explain any one physical clock synchronization method. [10]
B What is fault tolerance? Describe different types of failure models. [10]

Time:(3 Hours)

marks:80

N.B: 1) Question **number 1** is compulsory.

2) Attempt **any three** out of the remaining.

3) Assume suitable data if **necessary** and justify the assumptions.

4) Figures to the **right** indicate full marks.

Q 1

- A Explain how Monotonic read consistency model is different than Read your Write consistency model [5]
- B What is 1:M and M:1 group communication? [5]
- C Differentiate between NOS DOS and Middleware in the design of distributed systems [5]
- D What is fault tolerance? Explain failure models. [5]

Q 2

- A Explain code migration and its techniques. [10]
- B Explain Bully election algorithm with suitable example. [10]

Q 3

- A Explain Raymond's algorithm for mutual exclusion. [10]
- B What are different data centric consistency models [10]

Q 4

- A Explain different load estimation and process transfer policies used by load balancing algorithms. [10]
- B What are physical clocks? Explain any one physical clock synchronization algorithm. [10]

Q 5

- A What are different issues and goals related to distributed systems? [10]
- B Explain file caching schemes [10]

Q 6

- A Write a short note on Replication and the types of it. [10]
- B What is RPC? Explain working of RPC in detail [10]

Duration: 3hrs

[Max Marks:80]

- N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

- 1 Attempt any FOUR [20]
 - a Explain issues in designing Distributed system
 - b Compare NOS and DOS
 - c Explain desirable features of global scheduling algorithm
 - d Explain the need of election algorithm.
 - e Justify how Ricart-Agrawala's algorithm optimized the Message overhead in achieving mutual exclusion
- 2 a What is Remote procedure call? Explain how transparency is achieved in RPC [10]
b Explain various forms of message oriented communication with suitable example [10]
- 3 a What is logical clock? Why are logical clocks required in distributed systems? How Lamport does synchronizes logical clock? Which events are said to be concurrent in Lamports timestamp [10]
b Explain Chandy -Misra_Hass Algorithm for distributed deadlock detection. [10]
- 4 a Explain different load estimation and process transfer policies used by load balancing algorithms. [10]
b Describe code migration issues in details [10]
- 5 a Discuss and differentiate various client consistency models. [10]
b Explain Absolute ordering and Casual ordering process with the help of example for many to many communication. [10]
- 6 a List desirable features of distributed File system. How are modifications propagated in file caching schemes? [10]
b Discuss Raymonds tree based algorithm of token based in distributed mutual exclusion [10]
