Do Dhavamder Prasad Mahat



National Institute of Technology Hamirpur Himachal Pradesh-177 005, India End Semester Theory Examination (May 2023) Department of Computer Science and Engineering

Degree Program: B.Tech and Dual Degree Course Title: Distributed Systems Date of Examination: 05-05-2023, Teacher's name: Dr. D. P. Mahato Course Code: CS-321 Student's name: _____ Class: 3rd Year Semester: 6th Session: E Time duration: 3 hours (02.30 PM to 05.30 PM) Total Marks: 50 Roll No: ______

General Instructions:

• All the questions are compulsory.

Q.1) (a) What do you know about Byzantine Agreement Problems?

(b) What is the difference between Byzantine Fault Tolerance and crash fault tolerance?

- (c) Is Byzantine failure most difficult? Explain.
- (d) Explain Lamport Shostak Pease Algorithm.

2+2+2+4=10 marks

5/5/2023

Q.2) (a) Explain Consensus Problem in Distributed System.

(b) What is FLP (Fischer, Lynch, and Paterson) theorem in the distributed system?

- (c) Why, according to FLP theorem, is consensus impossible in an asynchronous system? Explain.
- (d) What do you understand by the Wait-Free Consensus problem in the distributed system? Explain. Why does Wait-Free Consensus remain an open problem in the distributed system?

4+2+4+5=15 marks

Q.3) (a) What are the different challenges of distributed system?

(b) What is replication? Explain active and passive replication.

- (c) What is inter process communication?
- (d) Write about sequential consistency.

3+3+2+2=10 marks

- Q.4) (a) Write about the Bully algorithm and explain how it is different from other election algorithms.
- (b) Explain Raymond's tree-based algorithm for mutual exclusion.

2+3=5 marks

Please turn over...

Distributed	Systems
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- Q.5) (a) What are the different models of deadlocks?
- (b) What is the purpose of the wait-for-graph (WFG)? Give an example for WFG.
- (c) Explain the Ricart-Agrawala Algorithm for mutual exclusion. How many messages per critical section execution are required?
- (d) Explain Mackawa's algorithm for mutual exclusion.

2+2+3+3=10 marks