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Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Seventh Semester B.Tech Degree Supplementary Examination August 2021

Course Code: CS407

Course Name: DISTRIBUTED COMPUTING

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks.

Marks

- 1 Explain the concept of 'resource sharing' with respect to distributed systems. (4)
- 2 Identify different forms of 'heterogeneity' in terms of distributed systems. (4)
- 3 How the following three node properties change during the evolution of 'Internet-scale systems' to 'Contemporary systems'. a) Static, b) Discrete, c) Autonomous. (4)
- 4 List and explain flat file service operations. (4)
- 5 Describe the issues that can occur in UDP datagram communication. (4)
- 6 How does the AFS ensures that the cached copies of files are consistent when files may be updated by several clients? (4)
- 7 How serial equivalence helps to avoid 'The Lost Update' problem. Give proper examples. (4)
- 8 Explain the mechanism of detecting deadlock in distributed systems. (4)
- 9 In the central server algorithm for mutual exclusion, describe a situation in which two requests are not processed in happened-before order. (4)
- 10 Define distributed mutual exclusion and two essential requirements of mutual exclusion algorithms. (4)

PART B

Answer any two full questions, each carries 9 marks.

- 11 a) Identify different ways to make **separation of components** in a distributed system **invisible** to the end-user. (5)
b) Compare and contrast workstation model with workstation-server model. (4)
- 12 a) Explain the tasks in group membership management with a neat diagram (5)
b) Discuss about the various faults addressed by failure model. (4)

- 13 a) List and explain major issues in design of distributed systems with 'Massive Multiplayer Online Game' application in mind. (4.5)
- b) Describe possible occurrences of each of the main types of security threat (threats to processes, threats to communication channels, denial of service) that might occur in the 'Gmail'. (4.5)

PART C

Answer any two full questions, each carries 9 marks.

- 14 a) Describe the role of client and server stub procedures in RPC (4)
- b) Discuss about IP-Multicast and the role of 'multicast routers' in local and global multicast communication. (3)
- c) Cite the significance of 'Super nodes' within Skype architecture. (2)
- 15 a) How does the NFS automounter help to improve the performance and scalability of NFS? (4)
- b) List the types of navigations in name resolution. Differentiate recursive and non recursive server-controlled navigation. (5)
- 16 a) A Hotel's client interface provides two remote methods: (6)
- Booking:* Through this method, client supplies his/her name, required room type, Number of rooms, Date.
- Receipt:* The server provides booking receipt to customer.
- Explain the effects of May-be, At-least-once and At-most-once RPC call semantics in this scenario.
- b) Discuss the functions of VFS in NFS architecture. (3)

PART D

Answer any two full questions, each carries 12 marks.

- 17 a) Describe Nested transactions. What are the advantages of nested transactions? (6)
- b) Differentiate backward and forward validation in optimistic concurrency control. (3)
- c) What are the causes of Dirty read and Immature write problems associated with concurrency? Write an example for immature write in transactions. (3)
- 18 Compare Ring and Bully election algorithms with suitable examples. (12)
- 19 a) How 2-version locking and hierarchic locking improves concurrency? (6)
- b) State whether Maekawa's Voting algorithm is deadlock-prone or not? Justify. (6)
