

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: CS407
Course Name: DISTRIBUTED COMPUTING

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 4 marks.

Marks

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| 1 | List any 4 issues in the design of a distributed system. | (4) |
| 2 | What is the need of safety and liveness as requirements in an Election algorithm? | (4) |
| 3 | Explain the key techniques used for indirect communication. | (4) |
| 4 | Why Skype is called an Overlay network? | (4) |
| 5 | Evaluate the performance of Maekawa's voting algorithm with respect to fault tolerance | (4) |
| 6 | Why is "send_group" group communication primitive preferred over "send" primitive? | (4) |
| 7 | What is the difference between two-phase locking and strict two-phase locking in transactions? | (4) |
| 8 | What do you mean by Vice and Venus in AFS?. What are their roles? | (4) |
| 9 | State the rules for committing of nested transactions. | (4) |
| 10 | Define mobile agents. How can they be potential security threats? | (4) |

PART B

Answer any two full questions, each carries 9 marks.

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| 11 | a) What are the two variants of the interaction model in distributed systems? On what points do they differ? | (4) |
| | b) Describe any 4 key architectural patterns used in distributed systems. | (5) |
| 12 | a) List and explain the different types of communication paradigms used within distributed systems. | (6) |
| | b) A distributed system is defined as one in which hardware or software components located at networked computers communicate and coordinate their actions only by passing messages, What are the consequences of defining a distributed system in this manner? | (3) |
| 13 | a) Write notes on mobile and ubiquitous computing. | (4) |

- b) Compare work station server model with processor pool model. (5)

PART C

Answer any two full questions, each carries 9 marks.

- 14 a) Describe IP multicast in detail (6)
 b) Give notes on failure model for multicast datagrams. (3)
- 15 a) Explain the implementation of RPC mechanism with a neat diagram. (4)
 b) Summarize any five Distributed File System requirements. (5)
- 16 a) Explain NFS Architecture with diagram (5)
 b) Differentiate Andrew file system and NFS (4)

PART D

Answer any two full questions, each carries 12 marks.

- 17 a) Explain the lost update and inconsistent retrievals problems in concurrent transactions with the help of examples. (6)
 b) Why serial equivalence requires that once a transaction has released a lock on an object, it is not allowed to obtain any more locks. A server manages the objects a_1, a_2, \dots, a_n . The server provides two operations for its clients: *read(i)* returns the value of a_i ; *write(i, Value)* assigns *Value* to a_i .
 The transactions T and U are defined as follows:
 $T: x = \text{read}(j); y = \text{read}(i); \text{write}(j, 44); \text{write}(i, 33);$
 $U: x = \text{read}(k); \text{write}(i, 55); y = \text{read}(j); \text{write}(k, 66).$
 Describe an interleaving of the transactions T and U in which locks are released early with the effect that the interleaving is not serially equivalent. (6)
- 18 a) Describe a deadlock detection scheme for a single server with an example. (6)
 b) Write an algorithm to implement mutual exclusion between N processes that is based upon multicast and logical clocks. Illustrate the algorithm using the situation involving three processes p_1, p_2, p_3 . (6)
- 19 With an example and suitable figure describe the operation of bully algorithm. Justify whether it meets the requirements of election, during run of the algorithm. Also evaluate the performance of the above algorithm. (12)
