**KABARAKUNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**EXAMINATION FOR THE DEGREE OF BACHELOR SCIENCE IN COMPUTER SCIENCE/BMIT/IT/BSCF/**

**INTE 321/COMP 322: DISTRIBUTED SYSTEM**

**STREAM: Y2S1 TIME:**

**EXAMINATION SESSION : APRIL DATE: 2019**

**INSTRUCTIONS:**

1. **This question paper has five questions**
2. **QUESTION ONE IS COMPULSORY AND HAS 30 MARKS**
3. **Answer any other two questions worth 20 marks each.**

**QUESTION ONE (30 MARKS) COMPULSORY**

1. Explain any three problems solved by Google file system that other traditional file systems cannot handle  **(3marks)**
2. A system remains operational even when there is failure of some components within distributed system. Which characteristic in distributed system does that statement show? **(2marks).**
3. How is UTC as a standard for timekeeping important in the global time server? **(4mks)**
4. Describe the four properties of transaction using any transaction example and explain what it means for a transaction to “commit” and “abort”. **(5mks)**
5. Draw a three tiered architecture of a client server and explain how services are implemented in multiple servers **(5mks)**
6. What is the disadvantage of asynchronous distributed communication compared to synchronous communication **(2marks)**
7. What is fault tolerance? How does replication help in fault tolerance **(4mks)**
8. Discuss the term “transparency” as it pertains to distributed systems. **(5mks)**

**QUESTION TWO (20 marks)**

1. How do you achieve fault tolerant average in Berkeley algorithm of clock synchronization **(2marks)**
2. Explain any three characteristics of peer to peer computing model **(3mks)**
3. Why is an address not considered as consistent in naming an object in a distributed system? **(2marks)**
4. A banking system has its headquarters in Europe and branches are located worldwide. What are the limitations that need to be addressed in distribution of database in this regions **(5mks)**
5. Explain with an illustration the two ways in which the structure of a namespace can assume **(4marks)**
6. Distinguish between the two security levels in a Server Message Block **(2marks)**
7. Differentiate client/server and peer-to-peer architectures for distributed systems. **(2marks)**

**QUESTION THREE (20 marks)**

1. Give any three disadvantages of a centralized system compared to distributed system **(3marks)**
2. Classify the structure of namespace used in distributed system **(2marks)**
3. Which characteristic in distributed system is concerned with extensions and improvements **(2marks)**
4. Identify the Software and hardware service layers in distributed systems**(4marks)**
5. How do servers organize themselves in distributed transaction to ensure that either all of the servers involved commit the transaction or all of them abort the transaction **(3marks)**
6. Show how the network delay is compensated in the Cristian algorithm of synchronization **(3marks)**
7. When passing data values between different machines with different operating systems what problems have to be solved? How are these problems solved? **(3marks)**

**QUESTION FOUR (20 marks)**

1. What was the major shortcoming that the DNS addressed from the previous naming service **(2marks)**
2. Explain any three types of transparencies **(3marks)**
3. Three computers have clocks reading 10:30am, 10:31am and 10:33am. Execute using Berkeley Algorithm what will be the new time for the computers? What will happen to the clocks that will be trailing behind? **(5marks)**
4. Demonstrate the use of Network time Protocol (NTP) algorithm for Clock synchronization. **(4marks)**
5. Interprocess communication (IPC) basically requires information sharing among two or more processes. Distinguish two basic methods of information sharing **(4marks)**
6. Explain what problems can happen there is no concurrency control where multiple transactions are being executed at the same time. **(2marks)**

**QUESTION FIVE(20 marks)**

1. How do you achieve fault tolerant average in Berkeley algorithm **(2marks)**
2. Identify the four challenges encountered in the architectural models of distributed systems **(2marks)**
3. Assuming that 1sec=100ms, if the drift rate of a clock is 2ms/sec, calculate the clock skew of any two clocks and their readings after two days if their times are set initially to 10.00am **(4marks)**
4. Explain the difference between hierarchical namespace and directed acyclic graph **(4marks)**
5. What is a message? Interpret marshalling and unmarshalling in relation to a IPC **(5marks)**
6. What are the major issues that must be addressed in a distributed file system? **(3marks)**