



**NAMIPIA UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY  
**FACULTY OF COMPUTING AND INFORMATICS**

DEPARTMENT OF COMPUTER SCIENCE

<b>QUALIFICATION:</b> BACHELOR OF COMPUTER SCIENCE (COMMUNICATION NETWORKS)	
<b>QUALIFICATION CODE:</b> 08 BCHC	<b>LEVEL:</b> 6
<b>COURSE:</b> DISTRIBUTED SYSTEMS	<b>COURSE CODE:</b> DTS620S
<b>DATE:</b> JANUARY 2020	<b>SESSION:</b> THEORY
<b>DURATION:</b> 2 HOURS	<b>MARKS:</b> 70

<b>SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER:</b>	DR. ATLEE M. GAMUNDANI
<b>MODERATOR:</b>	PROF JOSE QUENUM

**THIS QUESTION PAPER CONSISTS OF 1 PAGE**  
(Excluding this front page)

**INSTRUCTIONS**

1. Answer ALL the questions.
2. Write clearly and neatly.
3. Begin each question on a new page.
4. Number the answers clearly as per the question paper numbering.
5. Marks/Scores per question paper are given in [ ].
6. NUST examination rules and regulations apply.

**PERMISSIBLE MATERIALS**

1. Scientific Calculator

### Question 1

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- (a) Give three types of hardware resources and three types of data or software resources that can usefully be shared. Give examples of their sharing as it occurs practically in distributed systems [12 marks].
- (b) Give and explain any two distributed file system goals [4 marks].
- (c) Explain how the use of P2P techniques and Agents, support scalability in distributed systems design? [4 marks].

### Question 2

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- (a) Given these five security mechanisms that can be used to implement security policies in distributed systems i.e. **encryption, digital signatures, authentication, authorization and auditing**. Select any three and explain how they can be implemented [6 marks].
- (b) Where exactly should security mechanisms be applied in a distributed system? Give practical examples in your answer [6 marks].
- (c) Explain with some examples the relationship between total ordered multicast and distributed consensus? [4 marks].
- (d) Highlight and expand on any two pros of active replication compared to passive replication [4 marks].

### Question 3

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- (a) Explain some of the problems that can be encountered in a distributed system due to RPC and RMI use for provisioning of transparency [4 marks].
- (b) Distributed multimedia applications place considerable demands on the underlying distributed infrastructure, how? [6 marks].
- (c) Imagine a Web server that maintains a table on which client IP addresses are mapped to the most recently accessed Web pages. When a client connects to the server, the server looks up the client in its table, and if found, returns the registered page. In your opinion, is this server Stateful or Stateless? Present an argument to support your opinion [6 marks].
- (d) Give and explain any two communication paradigms in distributed systems [4 marks].

### Question 4

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- (a) What ideas or facts show the challenges imposed by areas such as multimedia, mobility and multiplicity and the implications that this has for distributed systems design? [6 marks].
- (b) Can you defend the rationale for the emergence of component-based middleware? [4 marks].

\*\*\*\*\*END OF EXAMINATION PAPER\*\*\*\*\*