NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF COMPUTING AND INFORMATICS
DEPARTMENT OF COMPUTER SCIENCE

QUALIFICATION: BACHELOR OF COMPUTER SCIENCE, SYSTEMS ADMINISTRATION	
QUALIFICATION CODE: 07BACS	LEVEL: 6
COURSE NAME: DISTRIBUTED SYSTEMS	COURSE CODE: DTS620S
DATE: JANUARY 2024	PAPER: THEORY
DURATION: 2 HOURS	MARKS: 70 (100%)

SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION QUESTION PAPER	
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MODERATOR	PROF. JOSE QUENUM

INSTRUCTIONS

1) Answer ALL the questions on the answer scripts provided.
2) Be guided by the number of marks allocated when answering the questions.
3) Write clearly and neatly.
4) Show all your calculation/work.
5) Number your questions clearly.

THIS QUESTION PAPER CONSISTS OF 3 PAGES (Including this front page)

Question 1: [16 Marks]

a) Why is openness a major characteristic of distributed system design and what is it concerned with? (4)

b) List and explain 3 communication paradigms in distributed systems. (6)

c) Explain what the stub is in RMI in distributed applications and the tasks it performs. (6)

Question 2 [35]

a) Outline 4 advantages of HDFS over traditional databases. (4)

b) Distinguish the key idea between the Vector's clock and Lamport's logical clocks algorithm and how its key ideas are applied in distributed systems. (10)

c) Explain the importance of scalability in distributed systems and how hardware and software scalability is applied. (6)

d) Explain the concept of synchronization amongst processes in distributed file systems during message passing. (4)

e) List 3 security mechanisms to implement security policies in distributed systems? (4)

f) Differentiate between Concurrency and Location transparency (4)

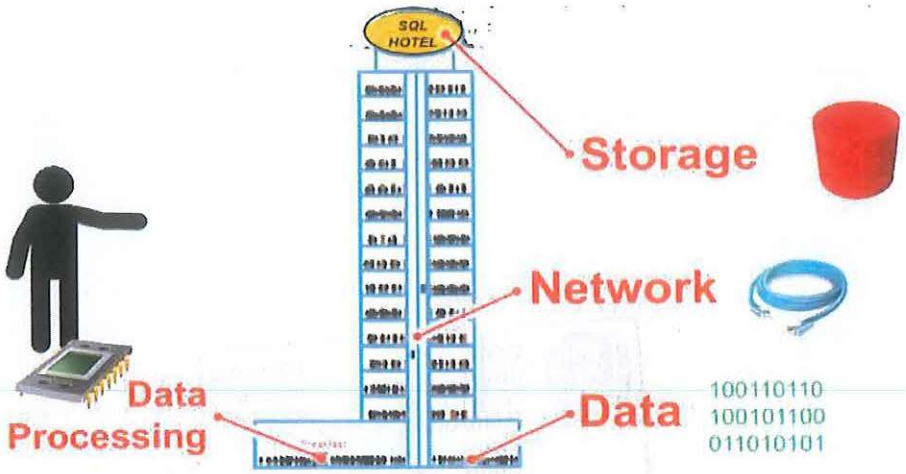
g) List any ***three (3)*** characteristics of early distributed system devices. (3)

Question 3 [Total: 19]

a) How would you use the four key security mechanisms used to implement security policies in distributed systems. (10)

b) Hotel XYZ which has been serving a popular breakfast on its ground floor. Due to increased publicity the hotel guests become more and that forced the hotel to expand its hotel floors by 5 more floors each with a capacity of 20 rooms from the initial 7 floors.
Subsequently, 2 more floors were added too. That extended the strain on the hotel kitchen

resources and their elevators were always congested during breakfast times mostly. Figure 1 is a representation of the hotel story and what each component of the hotel could represent in terms of distributed systems.



i. Select appropriate techniques in isolation or in combination to achieve a scalable the solution to the given challenge in Figure 1.

ii. Select appropriate techniques in isolation or in combination to achieve a scalable the solution to the given challenge in Figure 1. (9)

Exam Ends

Total 70 Marks