KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2022/2023 ACADEMIC YEAR
FOURTH YEAR, SECOND SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF SCIENCE
(BUSINESS ADMINISTRATION)

Date: 8th December, 2022
Time: 11.30am –1.30pm

KCS 409 - TRANSCATIONS PROCESSING AND DISTRIBUTED SYSTEMS

INSTRUCTIONS TO CANDIDATES

ANSWER **QUESTION ONE (COMPULSORY)** AND **ANY OTHER TWO** QUESTIONS

QUESTION ONE (30 MARKS)

a) Define the following terms as used in distributed systems
    i)   Distributed System
    ii)   Synchronization
    iii)   Middleware
    iv)   Race condition
    v)   Distributed Transaction   (5 Marks)

b) Distinguish between Computer Networks and Distributed Systems.
    (4 Marks)

c) Designate the four middleware services
    (4 Marks)

d) Describe the ACID properties of atomic transactions.
    (4 Marks)

e) Differentiate between commit and abort transaction
    (4 Marks)

f) What's the role of middleware in a distributed system
    (2 Marks)

g) Describe two main reasons why synchronization is need in distributed systems
    (2 Marks)

h) Describe the main disadvantage of view serializability.
    (1 Mark)

i) Explain the following types of message passing system
    i)   Blocking send
    ii)   Non-blocking send
    iii)   Blocking receive
    iv)   Non-blocking receive   (4 Marks)

QUESTION TWO (20 MARKS)

a) Briefly explain the meaning of the following terms in the context of parallel and distributed systems;

    i)   Mutual exclusion   (1 Mark)
    ii)   Dependability   (1 Mark)
    iii)   Availability   (1 Mark)
    iv)   Dead lock   (1 Mark)

b) Explain the transaction processing system components by giving role of each.

    (6 Marks)

c) Describe some of the typical problems, which caused by the concurrent execution of transactions.

    (6 Marks)

d) Consider a distributed environment with four systems, A,B,C and D. Name the type of transparencies required in each of the following situations:

    i)   Data available at all four systems and user want to modify the data at D.
    ii)   Printer connected to A is disconnected and connected to B. User wants to access that printer.
    iii)   Breakdown of system, D.
    iv)   User want to access the software X without knowing its whereabouts   (4 Marks)

QUESTION THREE (20 MARKS)

a) Briefly explain the following types of files
    i)   Unstructured files
    ii)   Structured files
    iii)   Immutable files
    iv)   Mutable files   (4 Marks)

b) The purpose of the System models is to illustrate common properties and design choices for distributed system in a single descriptive model. Discuss three types of these models

    (6 Marks)

c) State the two methods of implementing Remote Remote Inter - process Communication (IPC)

    (6 Marks)

d) Expound any four characteristics of a distributed system

    (8 Marks)

QUESTION FOUR (20 MARKS)

a) Contrast between centralized system and distributed systems.

    (4 Marks)

b) Explain any four design issues of distributed systems.

    (8 Marks)

c) Consider that railway reservation system is implemented using distributed environment. List out the possible types of transparencies need to be incorporated in this system. Justify your answer.

    (4 Marks)

d) Describe two main recovery techniques that support the database systems to reconstruct consistent database states when there is any failure in the database systems

    (4 Marks)

QUESTION FIVE (20 MARKS)

a)   The following are some of the most popular distributed systems in use today. Briefly describe them.

      i)   Cluster Computing

      ii)   Grid Computing

      iii)   Distributed Storage Systems

      iv)   Distributed Databases   (8 Marks)

b)   Security is assured in a distributed system using a number of mechanisms. Explain three mechanisms that can be deployed to secure the server of an e-commerce site.

                                                        (8 Marks)

c)   Elucidate the two types of replications used in distributed file systems.

                                                       (4 Marks)