

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY**

(MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

**FOURTH YEAR SECOND SEMESTER EXAMINATIONS
FOR THE DEGREE**

OF

BACHELOR OF SCIENCE OF IT/SST

COURSE CODE: BIT 424E

COURSE TITLE: ADVANCED DATABASE

DATE: Monday 25/04/2022

TIME: 12:00-2:00p.m

INSTRUCTIONS TO CANDIDATES

Question ONE (1) is compulsory
Attempt any TWO (2) questions

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over.

QUESTION ONE (30 MARKS)-COMPULSORY

- (a) Illustrate and explain using a diagram the **THREE** key steps of Query processing [6 marks]
- (b) Concurrency is the process of managing simultaneous operations on the database without having them interfere with one another. While concurrency improves the performance of a database, it comes with its own problems. Describe **THREE** problems associated with concurrency. [6 marks]
- (c) Describe **THREE** weaknesses of relational databases that provide motivation to use of object oriented databases. [6 marks]
- (d) Give **FOUR** facilities that DBMS should provide to assist with database recovery following a failure. [4 Marks]
- (e) Differentiate between data mining and data warehouse. [4 Marks]
- (f) A deadlock is an impasse that may result when two (or more) transactions are each waiting for locks held by the other to be released. Describe **TWO** techniques for handling deadlocks in DBMSs. [4 Marks]

QUESTION TWO [20 MARKS]

- (a) Two schedules S1 and S2 are said to be view equivalent if they satisfy the three conditions, state and explain these conditions [9 marks]
- (b) Using a relevant example, differentiate between serial and no serial schedule in DBMS [8 Marks]
- (c) State any three database indexing methods [3 Marks]

QUESTION THREE (20 MARKS)

- (a) Object oriented data modeling centers around objects and classes. Describe **THREE** benefits and **THREE** weaknesses of this approach compared with more established relational database models [6 Marks]
- (b) Discuss the three tier database architecture and data independence [6Marks]
- (c) Give a brief description of the following major components of ODMG architecture for an OODBMS
- Object model [2 Marks]
 - Object Definition Language (ODL) [2 Marks]
 - Object Query Language (OQL) [2 Marks]
 - Language bindings [2 Marks]

QUESTION FOUR (20 MARKS)

- (a) Discuss two of the problems associated with distributed database systems [4 marks]
- (b) Define the two main approaches to data security [4 marks]
- (c) List and explain any four of Date's rules for distributed data base systems [8 marks]
- (d) Briefly discuss any two data summarization technique. [4 marks]

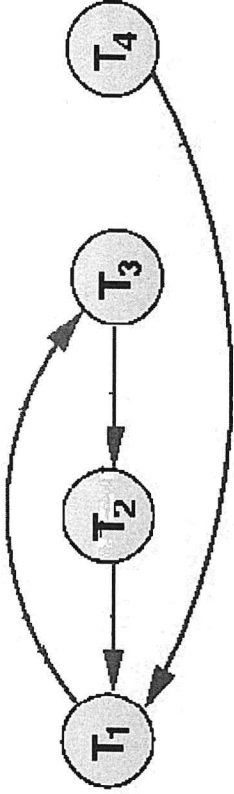
QUESTION FIVE [20 MARKS]

- a) Briefly describe the following data mining tasks
- i. Classification
 - ii. Clustering

[8 Marks]

- (b) The diagram below illustrates a wait-for-Graph consisting of transactions T_1 , T_2 , T_3 and T_4 . With reasons, Give the status of each of the transactions by specifying whether it is deadlocked or not

[4 Marks]



- (c) Illustrate using an example how you can employ check pointing to bring back a database into a consistent state after failure [4 Marks]
- (d) A log file contains information about all updates to database. Give **FOUR** components of a typical log file [4 Marks]