KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR

SPECIAL /SUPPLEMENTARY EXAMINATIONS
YEAR FOUR SEMESTER ONE EXAMINATIONS

FOR THE degree in
Computer Science

Course code	:	**CSC 461E**
Course title	:	**Database Administration and programming**

DATE: 13/01/2022   **TIME:** 08.00 A.M – 10.00 A.M

INSTRUCTIONS TO CANDIDATES

Answer Questions ONE and ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [30 MARKS]

a) Explain the role of the following modules in a DBMS   [4 Marks]

    i.   Transaction Manager

    ii.   Scheduler

    iii.   Buffer Manager

    iv.   Recovery Manager

b) Discuss any two tools used by database administrator to perform their roles   [4 Marks]

c) What is a Priviledge in database Security? Discuss three types of priviledges that can be enforced to ensure database security.   [8 Marks]

d) During its execution, a transaction passes through several states until it finally commits or aborts.   [10 Marks]

    i.   List all the possible sequence of states through which a transaction may pass.

    ii.   Explain why each state transition may occur.

e)   Query optimization is the central activity during the parsing phase in query processing. Discuss the two modes in which the query optimizer operates.   [4 Marks]

QUESTION TWO [20 MARKS]

a)   What are the necessary conditions that necessitate a rollback or a roll forward be done on an executing transaction?   [4 Marks]

b)   Explain what is meant by a transaction.   [2 Marks]

c)   Briefly describe the potential threat points in a database system   [6 Marks]

d)   What is a 'query processing bottleneck'? Discuss any three   components that may cause such bottlenecks in database   [8 Marks]

QUESTION THREE [20 MARKS]

a) Define the term deadlock and outline the two main methods of dealing with a deadlock problem. [6 Marks]

b) For a system to detect and recover from a deadlock situation, the system has to deal with several issues. Outline the issues and briefly discuss how the issues affect this process.

[4 Marks]

c) Describe, with examples, the types of problems that can occur in a multi-user environment when concurrent access to the database is allowed. [10 Marks]

QUESTION FOUR [20 MARKS]

a) Discuss the three phases of query processing. [6 Marks]

b) What is a transaction log? Briefly explain the functions of the transaction log in SQL Server. [4 Marks]

c) Explain the concepts of serial, nonserial, and serializable schedules. State the rules for equivalence of schedules. [6 Marks]

d) Explain two reasons of allowing concurrency in a database system [4 Marks]

QUESTION FIVE [20 MARKS]

Discuss the pessimistic and optimistic concurrency control techniques [20 Marks]