



KIBABII UNIVERSITY
(KIBU)

UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR

SPECIAL/SUPPLEMENTARY EXAMINATIONS
YEAR THREE SEMESTER ONE EXAMINATIONS

FOR THE DEGREE IN
(INFORMATION TECHNOLOGY)

COURSE CODE : BIT 316
COURSE TITLE : DATABASE ADMINISTRATION

DATE: 18/11/2022 **TIME: 8.00 A.M. – 10.00 A.M.**

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [30 MARKS]

- a) Locking is used in Concurrency Control to Guarantees exclusive use of a data item the levels of locking. [6 Marks]
- b) Database security can be characterized based on various dimensions, explain the dimensions [5 Marks]
- c) To move KES 20,000 from Jane's checking account to her savings account, you need to perform at least three steps: [6 Marks]
- Make sure her checking account balance is greater than KES 20,000.
 - Subtract KES 20,000 from her checking account balance.
 - Add KES 20,000 to her savings account balance.

Assuming the process was successful, write a transaction for the entire process.

- d) Use an example to explain the meaning of the term "dirty read" in transaction. [3 marks]
- e) Explain each of the following terms as used in data recovery in database systems [6 Marks]
- a) Check point
 - b) Manual reprocessing
 - c) Immediate update
- f) Describe some bottlenecks in DBMS performance and propose some solutions used in DBMS performance tuning. [4 Marks]

QUESTION TWO [20 MARKS]

- a) Outline three limitations Hash indexes in MySQL server. [3 Marks]
- b) Distinguish between *execution-time* and *wait analysis* as used in database profiling. [2 Marks]
- c) As a query progresses through its lifecycle, its state changes many times, explain three of the states [5 Marks]
- d) Consider a transaction in a banking database where a bank customer transfers money from a saving account #3208 to a checking account #3209, the transaction can consist of four operations
- Check balance in account #3208
 - Decrement the saving account
 - Increment the checking account
 - Record the transaction in the transaction log

- e) Write the SQL statement that would execute the four transaction [6 Marks]
- f) Briefly explain the role of a scheduler in concurrency Control [4 Marks]

QUESTION THREE [20 MARKS]

- a) Explain the meaning of concurrency and its usefulness in DBMS. [3 Marks]
- b) With the aid of a diagram explain the process MySQL follows when executing queries. [6 marks]
- c) John an I.T graduate applied for a job at the Independent Electoral Commission to work as database administrator, outline four duties expected under the job description. [4 marks]
- d) Outline three simplest query cost metrics used in MySQL server. [3 marks]
- e) Explain two privileges used in database administration used to grant access to a named object. [4 marks]

QUESTION FOUR [20 MARKS]

- a) The commands **COMMIT** and **ROLLBACK** are used to help maintain database consistency during transaction management. Briefly discuss each [2 Marks]
- b) Explain how each of the following mechanisms contribute to providing security for a database [2 Marks]
- (i) Authorization [2 Marks]
 - (ii) Authentication [2 Marks]
 - (iii) Back up [2 Marks]
 - (iv) Recovery [2 Marks]
- c) For a transaction to either abort or commit there are other states that it must undergo. Briefly explain the states that a transaction must undergo [5 Marks]
- d) What are the necessary condition that necessitates a roll back or a rollforward be done on an executing transaction [5 Marks]

QUESTION FIVE [20 MARKS]

- a) What is the difference between a rule-based optimizer and a cost-based optimizer? [4 Marks]
- b) Define the term deadlock and outline the two main methods of dealing with a deadlock problem [5 Marks]
- c) Define the term timestamp in relation to a transaction [2 Marks]

- d) With the aid of an example briefly discuss the two deadlock prevention schemes that use timestamping [5 Marks]
- e) Give the significant differences on the schemes discuss in (ii) above operate [4 Marks]