



KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR**

**END OF SEMESTER EXAMINATIONS
YEAR FOUR SEMESTER ONE EXAMINATIONS**

**FOR THE DEGREE IN
COMPUTER SCIENCE**

**COURSE CODE : CSC 461 E
COURSE TITLE : DATABASE
ADMINISTRATION AND
PROGRAMMING**

DATE: 18/05/2022

TIME: 02.00 P.M – 04.00 P.M.

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [30 MARKS]

- a) During recovery of a database, there was a transaction failure. Explain a reason that may have caused each of the following types of errors **[4 Marks]**
- i. Logical errors
 - ii. System errors
- b) Briefly describe four types of database threats a database administrator is likely to encounter **[6 Marks]**
- c) Explain the following modules of a database management system and their role in database administration **[8 Marks]**
- i) Transaction Manager
 - ii) Recovery Manager
 - iii) Cache Manager
 - iv) Lock Manager
- d) Distinguish between the read phase and the write phase as part of the optimistic approach of concurrency control **[4 Marks]**
- e) Explain the four file organization technique and state the appropriateness of each. **[8 Marks]**

QUESTION TWO [20 MARKS]

- a) Briefly explain the function of the transaction log in SQL Server. **[2 Marks]**
- b) Explain why each of the following is a threat to databases **[6 Marks]**
- i. Loss of integrity
 - ii. Loss of availability
 - iii. Loss of confidentiality
- c) Distinguish between a data administrator and database administrator as used in databases **[4 Marks]**
- d) Describe, with examples, the types of problem that can occur in a multi-user environment when concurrent access to the database is allowed. **[8 Marks]**

QUESTION THREE [20 MARKS]

- a) Briefly discuss the duties of a database administrator. **[5 Marks]**
- b) Discuss in detail how the ACID rules contribute to additional database Management systems (DBMS) security features **[8 Marks]**
- c) Discuss the types of problem that can occur with locking-based mechanisms for concurrency control and the actions that can be taken by a DBMS to prevent them. **[7 Marks]**

QUESTION FOUR [20 MARKS]

- a) Outline **four** types of states that a transaction may be in during processing in a database management system. **[4 Marks]**
- b) Briefly describe the **eight** factors to consider when choosing the right DBMS for use in an organization. **[8 Marks]**
- c) Briefly discuss heuristics that should be applied to improve the processing of a query. **[8 Marks]**

QUESTION FIVE [20 MARKS]

- a) A security policy is important in any organization that needs to secure its data. Discuss any four security issues that need to be included in such a security plan. **[8 Marks]**
- b) What is a timestamp? How timestamp do based protocols for concurrency control differ from locking based protocols? **[6 Marks]**
- c) Explain two recovery techniques that can be used in case of database failure **[6 Marks]**