



**ALUPE
UNIVERSITY**

**OFFICE OF THE DEPUTY VICE CHANCELLOR
ACADEMICS, RESEARCH AND STUDENT AFFAIRS**

UNIVERSITY EXAMINATIONS

2025/2026 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER MAIN EXAMINATION

FOR THE BACHELOR OF BUSINESS INFORMATION TECHNOLOGY

COURSE CODE: BBIT 113

COURSE TITLE: DATABASE MANAGEMENT SYSTEMS

DATE: 08/12/2025

TIME: 800AM-12.00PM

INSTRUCTIONS TO CANDIDATES

- SEE INSIDE
- THIS PAPER CONSISTS OF 3 PRINTED PAGES
- PLEASE TURN OVER

BBIT 113: DATABASE MANAGEMENT SYSTEMS

INSTRUCTIONS TO CANDIDATES

- i. Section A is compulsory. Answer all questions in that section.
- ii. In Section B, answer any **TWO** questions.
- iii. Clarity, accuracy, and logical flow are essential.
- iv. Creativity and applied reasoning will be rewarded.

SECTION A (30 MARKS)

Case Study – “SmartBank’s Data Dilemma”

SmartBank Kenya Ltd, a mid-sized financial institution, recently decided to modernize its data management systems. The bank had been using traditional file-based systems that often resulted in data redundancy, inconsistency, and slow report generation. To solve this, management invested in a relational Database Management System (DBMS) built on PostgreSQL. The new system was expected to handle customer data, loan records, and transaction histories efficiently while allowing multiple departments to access information concurrently. However, challenges quickly emerged. During peak transaction hours, users reported delays in data retrieval and occasional transaction rollbacks. The IT department discovered issues with database indexing and poor query optimization. Additionally, auditors noted that sensitive client information was accessible to too many employees, raising serious security concerns. In response, the Database Administrator (DBA) began implementing access control policies, user privileges, and encryption for stored data. To strengthen resilience, SmartBank introduced a distributed database model across its branches in Kisumu, Mombasa, and Nairobi. This increased availability but brought new challenges in synchronization and transaction management. After a minor system outage caused partial data loss, the DBA developed new backup and recovery procedures and initiated staff training on transaction handling. Management is now keen on achieving full compliance with data protection regulations and ensuring optimal database performance across all branches.

Answer ALL Questions

- i. Identify and explain **Five** problems SmartBank faced with its initial file-based data management system. **(5 Marks)**
- ii. Discuss **Five** advantages realized after migrating to a relational DBMS. **(5 Marks)**
- iii. Evaluate **Two** causes of transaction rollbacks and **three** solutions to optimize database performance. **(5 Marks)**
- iv. Explain **Five** security measures the DBA can implement to protect sensitive customer information. **(5 Marks)**
- v. Discuss **Five** ways distributed databases improve operational efficiency in a multi-

branch organization.(5 Marks)

vi. Outline **Five** key elements of an effective backup and recovery strategy in database administration.(5 Marks)

SECTION B (40 MARKS)

Answer any TWO questions

QUESTION TWO

- a) Discuss the main components of a Database Management System and explain how each supports effective data management. (10 marks)
- b) Using suitable examples, differentiate between hierarchical, network, and relational data models. (10 marks)

QUESTION THREE

- a) Analyse the importance of normalization in database design and explain how it enhances data integrity. (10 marks)
- b) Describe five key features of SQL that make it essential for data definition and manipulation. (10 marks)

QUESTION FOUR

- a) Discuss five challenges commonly faced in database security management and propose mitigation strategies. (10 marks)
- b) Evaluate the role of a Database Administrator (DBA) in ensuring system performance, availability, and reliability. (10 marks)