



ZIMBABWE EZEKIEL GUTI UNIVERSITY

FACULTY OF, SCIENCE, TECHNOLOGY, AGRIC AND FOOD SYSTEMS
DEVELOPMENT

DEPARTMENT OF COMPUTER AND DATA SCIENCE TECHNOLOGY

EXAMINATION PAPER

COURSE CODE : BIS 121
COURSE TITLE : Database Systems
SPECIAL REQUIREMENTS : None
DURATION : 3 Hours
LEVEL : 1.2
DATE : November 2025

25 NOV 2025

INSTRUCTIONS TO CANDIDATES:

1. The exam consists of 5 questions and 3 printed pages.
2. Answer any 4 Questions from the whole paper.
3. Each question carries 25 marks.
4. The total Marks for the examination is 100.
5. The marks allocation for each question are indicated in square brackets [] .

Question 1

- a. Define the following terms:
- i) Domain. [2]
 - ii) Derived attribute. [2]
 - iii) Weak entity [2]
 - iv) Composite attribute. [2]
 - v) Multivalued attribute. [2]
- b. Draw a state transition diagram illustrating the states for transaction execution. [5]
- c. Briefly describe the diagram you have drawn above. [6]
- d. Differentiate between logical data independence and physical data independence. [4]

[TOTAL 25]

Question 2

- a. With appropriate examples discuss the ACIDS properties of a transaction. [15]
- b. Write SQL statements to create a table named STUDENT with the following attributes:
- StudNum (primary key), Course (foreign key), Level and Sex. [6]
- c. List the advantages of concurrent executions of transactions [4]

[TOTAL 25]

Question 3

- a) Explain the contents of an ER diagram? [2]
- b) Suppose you are given the following requirements for a simple database for the Northern Zone Hockey League(NZHL):
- The NZHL has many teams,
 - Each team has a name, a city, a coach, a captain, and a set of players,
 - Each player belongs to only one team,
 - Each player has a name, a position, a skill level, and a set of injury records,
 - A team captain is also a player,
 - A game is played between two teams (referred to as host team and guest team) and has a date and a score (such as 2 to 1).
- Construct an ER diagram for the NZHL database. [10]
- c) Discuss the acid properties of a database. [10]
- d) Give three different application areas of databases [3]

[TOTAL 25]

Question 4

a. Give a brief discussion of the advantages of DBMS
[15]

b. Discuss each of the following concepts in the context of the relational data model:

- a. Tuple. [2]
- b. View. [2]
- c. Cardinality. [2]
- d. Relation. [2]
- e. Degree. [2]

[TOTAL 25]

Question 5

- a. Explain a deadlock. [4]
- b. Describe 2 ways in which the deadlock can be prevented. [6]
- c. Use two transactions T1 and T2 to demonstrate deadlock. [4]
- d. Use diagrams to represent the following ERD elements [2]
 - i) Entity [2]
 - ii) Weak entity [2]
 - iii) Multivalued attribute [2]
 - iv) Weak relationship [2]
- e. Describe a transaction [3]

[TOTAL 25]

End of Paper

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