

SECTION A: ANSWER ALL QUESTIONS

Question one (30 marks)

- a) State and briefly explain four main characteristics of a database transaction. (4 marks)
- b) Explain the meaning of the following pattern matching character sets in string operations. (4 marks)
- i) "Contract %"
 - ii) "%ory"
 - iii) "___"
 - iv) "___%"
- c) Use appropriate SQL statements to explain the functions of the two main languages constituting SQL. (4 marks)
- d) State and briefly explain any four reasons for using Database management system (DBMS) in preference to file system. (4 marks)
- e) Differentiate between Domain Constraint and Key Constraint. (2 marks)
- f) State and briefly explain six Functions of a typical DBMS. (4 marks)
- g) State and briefly explain five major parts of a database system. (5 marks)
- h) Use a relevant E-R diagram to explain a ternary relationship in a relational database model. (3 marks)

SECTION B: ANSWER ANY TWO QUESTIONS

Question Two (20 marks)

An institution database is composed of suppliers and products tables. The fields in the suppliers table are: supplierID of integer data type, name of string data type, phone of string data type, the primary key supplierID. The fields in the products table are: productID of integer data type, productCode of string data type, name of string data type, quantity of integer data type, price of decimal data type, the primary key is productId. The association between the two tables is many to many and they are linked by a table called products_suppliers.

- a) Write a conceptual schema for the database. (2 marks)
- b) Draw E-R representation of the database. (5 marks)
- c) Write SQL code to implement the database. (9 marks)
- d) Write SQL codes to place one record in suppliers table and one record in products table. (4 marks)

Question Three (20 marks)

- a) Explain the various phase in the database life cycle (DBLC). (9 marks)
- b) Explain the procedure you can use to transform E-R Diagrams to their equivalent SQL tables. (5 marks)
- c) Provide brief explanation of any six components of a DBMS. (6 marks)

Question Four (20 marks)

- a) Briefly discuss any three types of Database systems. (6 marks)
- b) State and briefly explain three basic techniques that can be used to control concurrency in Database Systems. (6 marks)
- c) With the aid of a well labelled diagram, describe the different schemas that can be used to represent a database system. (8 marks)

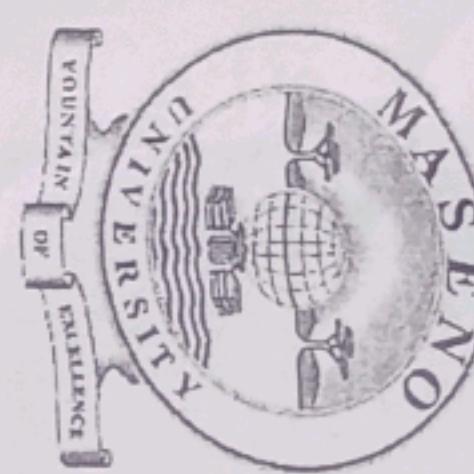
Question Five (20 Marks)

- a) Distinguish between Conceptual model and Physical model. (2 marks)
 b) Use the Product table below to answer the questions that follow.

Product

<u>ProductId</u>	Name	SupplierId	Quantity	UnitPrice	DateOrdered
2101	Unga 2kg	Swan Millers	250	150	2/1/2024
2102	Mumias sugar 1kg	Mumias Sugar	300	250	7/1/2024
2103	Soda 500ml	Equator Bottlers	440	35	12/1/2024
2104	Kimbo 2kg	E.A. Industries	600	250	12/1/2024
2105	Panga soap	Amalo ltd	200	190	5/2/2024
2106	Salt 1kg	Jambo Traders	100	35	8/2/2024
2107	Kapa oil 10ltr	Kapa Industries	100	3500	10/2/2024
2108	Queen cake	Kano Women	800	10	15/2/2024

- i) Write a conceptual model representation of the above table. (2 marks)
- ii) Write an SQL code to create the structure of the above table (5 marks)
- iii) Write an SQL code to display the above table (1 marks)
- iv) Write an SQL code to display the products with the UnitPrice above 200 (2 marks)
- v) Write an SQL code to remove the products with the UnitPrice below 50 (2 marks)
- vi) Write an SQL code to add a product to the above table (2 marks)
- vii) Write an SQL code to add a column called "DateSupplied" to the above table (2 marks)
- viii) Write an SQL code to adjust the unit price of Kapa oil 10ltr to 4000 (2 marks)



MASENO UNIVERSITY UNIVERSITY EXAMINATIONS 2024/2025

FIRST YEAR SECOND SEMESTER EXAMINATIONS FOR THE
DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE,
BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY,
BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER
SCIENCE AND BACHELOR OF EDUCATION SCIENCE WITH
INFORMATION TECHNOLOGY

MAIN CAMPUS

CIR 106: DATABASE SYSTEMS

Date: 30th April, 2025

Time: 8. 30 - 11. 30 am

INSTRUCTIONS:

- DO NOT write anywhere on this question paper
- Answer ALL questions in SECTION A and any other TWO from SECTION B
- Write your registration number on all sheets of the answer book used.
- Use a NEW PAGE FOR EVERY QUESTION attempted, and indicate number on the space provided on the page of the answer sheet.
- Fasten together all loose answer sheets used.

SECTION A: ANSWER ALL QUESTIONS

Question one (30 marks)

- a) Differentiate between the following terminologies/phrases as used in Database Systems development.
- i) Database and database management system. (2 marks)
 - ii) Relation and entity instance. (2 marks)
 - iii) Field and Tuple. (2 marks)
 - iv) Degree and Cardinality. (2 marks)
 - v) Primary key and Foreign key. (2 marks)
 - vi) Data definition language and Data manipulation language. (2 marks)
- b) State and briefly three advantages and one disadvantages of Database Systems. (4 marks)
- c) Explain the meaning of the following pattern matching character sets in string operations. (3 marks)
- i) "Contract %"
 - ii) "%ly"
 - iii) "- - %"
- d) State and briefly explain any three reasons for using Database management system (DBMS) in preference to file system. (3 marks)
- e) State and briefly explain any four functions of a typical DBMS. (4 marks)
- f) State and briefly explain four major parts of a database system. (4 marks)

SECTION B: ANSWER ANY TWO QUESTIONS

Question Two (20 Marks)

- a) State and briefly explain four main characteristics of a database transaction. (4 marks)
b) Use the Product table below to answer the questions that follow:

Product

ProductId	Name	SupplierId	Quantity	UnitPrice	DateOrdered
2101	Unga 2kg	Swan Millers	250	150	2/1/2024
2102	Mumias sugar 1kg	Mumias Sugar	300	250	7/1/2024
2103	Soda 500ml	Equator Bottlers	440	35	12/1/2024
2104	Kimbo 2kg	E.A. Industries	600	250	12/1/2024
2105	Panga soap	Amalo ltd	200	190	5/2/2024
2106	Salt 1kg	Jambo Traders	100	35	8/2/2024
2107	Kapa oil 10ltr	Kapa Industries	100	3500	10/2/2024
2108	Queen cake	Kano Women	800	10	15/2/2024

- i) Write a conceptual model representation of the above table. (2 marks)
- ii) Write an SQL code to create the structure of the above table (3 marks)
- iii) Write an SQL code to display the above table (1 marks)
- iv) Write an SQL code to display the products with the UnitPrice above 200 (2 marks)
- v) Write an SQL code to remove the products with the UnitPrice below 50 (2 marks)
- vi) Write an SQL code to add a product to the above table after add (2 marks)
- vii) Write an SQL code to adjust the unit price of Kapa oil 10ltr to 4000 (2 marks)

Question Three (20 marks)

- a) Explain the various phase in the database life cycle (DBLC). (9 marks)
- b) Explain the procedure you can use to transform E-R Diagrams to their equivalent SQL tables. (5 marks)
- c) Provide brief explanation of any six components of a DBMS. (6 marks)

Question Four (20 marks)

- a) Briefly discuss any three types of Database systems. (6 marks)
- b) State and briefly explain three basic techniques that can be used to control concurrency in Database Systems. (6 marks)
- c) With the aid of a well labelled diagram, describe the different schemas that can be used to represent a database system. (8 marks)

Question Five (20 marks)

A road construction Company wishes to develop a database system for storing data for its projects and employees. A project can be described by number, name, location and cost. An employee can be described by identity, name, gender, date of birth, rank, age and salary. It is required that more than one employee can work in a project at a time.

- a) Represent the above database using E-R diagram. (4 marks)
- b) Write a conceptual schema for the database. (4 marks)
- c) Write SQL code to create the database. (1 marks)
- d) Write SQL code to create the two relations. (5 marks)
- e) Write SQL code to place a record in each relation. (4 marks)
- f) Write SQL code to view the records you have placed in each of the tables. (2 marks)