



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF COMPUTING AND INFORMATICS
DEPARTMENT OF SOFTWARE ENGINEERING**

QUALIFICATION: BACHELOR OF COMPUTER SCIENCE, BACHELOR OF INFORMATICS, BACHELOR OF CYBER SECURITY, BACHELOR OF GEOINFORMATICS, BACHELOR OF LAND ADMINISTRATION	
QUALIFICATION CODE: 07BCMS, 07BAIT, 07BCCS, 07BGEI, 07BLAM	LEVEL: 5
COURSE CODE: DBF510S	COURSE NAME: DATABASE FUNDAMENTALS
SESSION: JUNE 2025	PAPER: THEORY
DURATION: 2 HOURS	MARKS: 70

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER:	MRS SHILUMBE CHIVUNO-KURIA
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INSTRUCTIONS
<ol style="list-style-type: none">1. Attempt all Questions.2. All questions have to be answered in the <u>Answer Booklet</u>. <u>Clearly indicate the section and question number for each answer.</u>3. The allocation of marks is an indication of the extent of the expected answer. Answering more than expected does not result in higher marks. Keywords alone are not enough.4. There are no books, notes or any other additional aids allowed in the examination.

PERMISSIBLE MATERIALS

1. Examination paper
2. Examination script

THIS QUESTION PAPER CONSISTS OF 5 PAGES (Including this front page)

Answer ALL the questions in this paper.

SECTION A:

[Marks: 20]

Question 1:

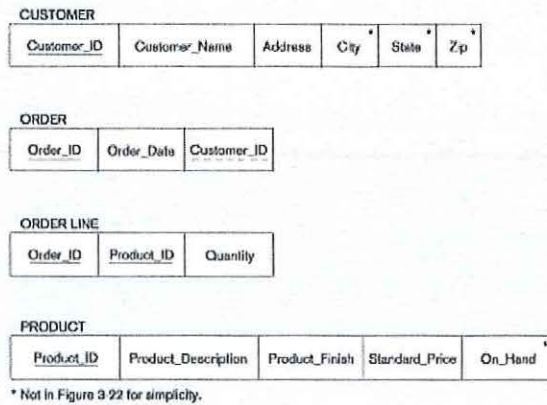
Multiple Choice Questions

[10 Marks]

- Answer all the questions in the answer booklet that has been provided.
- Select the best answer.

1. Which of the following is not a feature of DBMS?
 - a) Minimum Duplication and low Redundancy of Data
 - b) High Level of Security
 - c) Single-user Access only
 - d) Data Independence
2. Which command is used to remove a relation in SQL?
 - a) Drop table
 - b) Delete table
 - c) Purge table
 - d) Remove table
3. _____ indicates the maximum number of entities that can be involved in a relationship.
 - a) Greater Entity Count
 - b) Minimum cardinality
 - c) Maximum cardinality
 - d) ERD
4. Which relational algebra operation is used for selection?
 - a) σ (sigma)
 - b) π (pi)
 - c) \times (cross product)
 - d) \cup (union)
5. Which of the following statements is true for NULL?
 - a) $\text{NULL} = \text{NULL}$
 - b) $\text{NULL} \neq \text{NULL}$
 - c) NULL is zero
 - d) NULL is empty string

6. In the Figure below, CustomerID in the ORDER Table is what type of key?



- a) Composite
 - b) Foreign
 - c) Derived
 - d) Primary
7. Which SQL clauses combine rows from two tables based on a related column?
- a) MERGE
 - b) JOIN
 - c) INTERSECT
 - d) UNION
8. Which of the following is not a valid SQL data type?
- a) INT
 - b) VARCHAR
 - c) FLOAT
 - d) TEXTBOX
9. What is the result of a CROSS JOIN?
- a) Only matching rows
 - b) Cartesian product
 - c) Only unique rows
 - d) No rows
10. Which of the following is NOT a valid SQL aggregate function?
- a) AVG
 - b) MIN
 - c) MAX
 - d) MULTIPLY

Question 2**[10 marks]**Indicate whether the following statements are **True** or **False** in your answer booklet.

ID	Statement/Description	True	False
1	The UNION set operator removes duplicates by default.		
2	Views can be used to simplify complex queries.		
3	SQL commands are case-sensitive.		
4	Normalisation increases data redundancy.		
5	A primary key can have NULL values.		
6	Indexes can speed up data retrieval.		
7	Constraints enforce rules at the table level.		
8	A LEFT JOIN returns unmatched rows from the right table.		
9	HAVING is used after GROUP BY to filter grouped data.		
10	ROLLBACK undoes all changes since the last COMMIT.		

SECTION B: CONCEPTS**[Marks: 10]**

1. Explain the difference between a candidate key, primary key, and foreign key. [3 Marks]
2. Explain the purpose and use of the GROUP BY clause in SQL using an example. [3 Marks]
3. Given the following tables Department(DepartmentID, DepartmentName, LocationID) and Employee(EmployeeID, EmployeeName, DepartmentID). Write a SQL Command that will retrieve EmployeeID, EmployeeName and DepartmentName. [4 Marks]

SECTION C: COMPREHENSION**[Marks: 40]**

1. Given the following scenario, create an appropriate ER diagram. Include at least 3 attributes and 1 primary Key for each entity. Include the cardinality and relationships. Use Crow's Foot Notation. [13 Marks]

A small community library wants you to design and develop a database system to manage books, their members, and record borrowing records. Each member may or may not borrow many books. Each Book can have one bookloan at a time to one member.

2. A business keeps track of all the Sales orders in a single table shown below.
- a. What normal form is the table in? Briefly explain why you say it is in that state. [2 Marks]
- b. Normalise the table to third Normal form by briefly explaining what happens at every stage and specify the normal form of each table with sample data. [12 Marks]

OrderID	CustomerName	CustomerAddress	ProductID	ProductName	Quantity
1001	Maria Shikongo	456 Ruacana Street	200,300	Laptop, Keyboard	1, 3
1002	John Davids	123 Popa street	200	Laptop	2

3. Write a SQL statement to create a database called ProductSales. [1 Mark]
4. Write SQL code to create the normalised tables in Q. 2 with the appropriate datatypes and include the constraints. Include a foreign key in one of the tables. [9 Marks]
5. Write a query that will insert all the rows into the tables created in Q.3. [3 Marks]

***** End of the Paper *****