NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF COMPUTING AND INFORMATICS

DEPARTMENT OF COMPUTER SCIENCE

QUALIFICATION: BACHELOR OF COMPUTER SCIENCE, BACHELOR OF GEOMATICS, BACHELOR OF LAND ADMINISTRATION, BACHELOR OF GEO INFORMATION TECHNOLOGY, BACHELOR OF INFORMATICS, BACHELOR OF COMPUTER SCIENCE IN CYBER SECURITY, DIPLOMA IN GEOMATICS	
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COURSE CODE: DBF510S	COURSE NAME: DATABASE FUNDAMENTALS
SESSION: JUNE 2022	PAPER: THEORY
DURATION: 2 HOURS	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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INSTRUCTIONS TO CANDIDATES	
	1. Answer ALL questions in ALL sections of this paper.
	2. Please, ensure that your writing is legible, neat and presentable.
	3. Number your answers clearly on the answer booklet provided.
	4. Write your student number, study mode and group number clearly on your answer booklet.

THIS QUESTION PAPER CONSISTS OF _9_ PAGES (Including this front page)

SECTION A   MULTIPLE CHOICE 20 MARKS

1.The function of a database is to _____.

A. Collect and organise input data
B. Check all input data
C. Check all spelling
D. Output data

2. A _____ is the set of allowable values for one or more attributes.

A. Cardinality
B. Tuple
C. Degree
D. Domain

3. Within a table, the primary key must be unique so that it will identify each row. When this is the case, the table is said to exhibit _____integrity.

A. Referential
B. Entity
C. Enforced
D. Key

4. The set of possible values of a column is called a _____.

A. Range
B. Product
C. Domain
D. Function

5.Which of the following are Data Manipulation Language (DML) statements?

i. SELECT

ii. ALTER

iii. DROP

iv. DELETE

A. i, iv
B. ii, iii
C. i, ii, iii

D. ii, iii, iv

6.The following operation is used to update the structure of the database table.

A. Alter
B. Update
C. Change
D. None of the above

7. Values of key attributes cannot be NULL is the requirement of _____.

A. Key Constraint
B. Entity Integrity Constraint
C. Referential Integrity
D. None of the above

8. E-R model uses this symbol to represent a weak entity set?

A. Dotted rectangle.
B. Diamond
C. Doubly outlined rectangle
D. None one of these

9. To remove duplicate rows from the results of an SQL SELECT statement, we include _____ in the statement.

A. ONLY
B. UNIQUE
C. DISTINCT
D. SINGLE

10. Which SQL keyword is used to sort the result-set?

A. SORT BY
B. ALIGN BY
C. ORDER BY
D. GROUP BY

11. The degree of an entity related to itself is _____.

A. Recursive
B. Ternary

C. Binary

D. Single

12. An attribute of an entity with many values is called a _____ attribute.

A. Derived

B. Multivalued

C. Composite

D. Comparison

13. Examine the structure of the MEMBERS table:

    MEMBER_ID NOT NULL VARCHAR(6)

    FIRST_NAME VARCHAR(50)

    LAST_NAME NOT NULL VARCHAR(50)

    ADDRESS VARCHAR(50)

    CITY VARCHAR(25)

    STATE VARCHAR(3)

You want to display details of all members who reside in states starting with the letter 'A' followed by exactly one character. Which SQL statement must you execute?

A. SELECT * FROM MEMBERS WHERE state LIKE '%A_*';

B. SELECT * FROM MEMBERS WHERE state LIKE 'A_*';

C. SELECT * FROM MEMBERS WHERE state LIKE 'A_%';

D. SELECT * FROM MEMBERS WHERE state LIKE 'A%';

14. Create table is a?

A. DDL Command

B. DML Command

C. Both A and B

D. None of the above

15. Examine the structure of the MEMBERS table:

    MEMBER_ID NOT NULL VARCHAR(6)

    FIRST_NAME VARCHAR(50)

    LAST_NAME NOT NULL VARCHAR(50)

    ADDRESS VARCHAR(50)

You execute the SQL statement:

  SELECT MEMBER_ID, ' ', FIRST_NAME, ' ', LAST_NAME "ID FIRSTNAME LASTNAME" FROM MEMBERS;

What is the outcome?

A. It fails because the alias name specified after the column names is invalid
B. It fails because the space specified in single quotation marks after the first two column names is invalid
C. It executes successfully and displays the column details in a single column with only the alias column heading
D. It executes successfully and displays the column details in three separate columns and replaces only the last column heading with the alias

16. The Acronym SQL stands for:

A.Structured Quick Language
B. Structured Queue Language
C. Structured Query Learning
D. Structured Query Language

17. We want to find all Students whose name contains 'na'. Which statement will execute successfully to get the desired output?

A. SELECT *
FROM students
WHERE first_name LIKE '%na%' OR
last_name LIKE '%na%';
B. SELECT *
WHERE first_name LIKE '%na%' OR
last_name LIKE '%na%';
C. SELECT *
FROM students
WHERE first_name LIKE '%na%' ;
last_name LIKE '%na%';
D. SELECT *
FROM students
first_name LIKE '%na%' OR
last_name LIKE '%na%';

18. Which SQL statement is used to remove data from a database?

A. DROP
B. DELETE
C. COLLAPSE
D. REMOVE

19. Which statement is true regarding the default behavior of the ORDER BY clause?

A. In a character sort, the values are case sensitive
B. NULL values are not considered at all by the sort operation
C. Only those columns that are specified in the SELECT list can be used in the ORDER BY clause
D. Numeric values are displayed from the maximum to the minimum value if they have decimal positions

20. Which statement is true regarding the UNION operator?

A. By default, the output is not sorted
B. Null values are not ignored during duplicate checking
C. Names of all columns must be identical across all select statements
D. The number of columns selected in all select statements need not be the same.

SECTION B: (40 MARKS)

Question 1:

Explain how the following constraints are enforced.

i.	Domain constraint	[2 marks]
ii.	Referential integrity constraint	[2 marks]
iii.	Entity constraint	[2 marks]

Question 2:

Using examples, differentiate the following terms:

i.	Relation degree and relation cardinality	[3 marks]
ii.	Strong entity and weak entity	[3 marks]
iii.	Candidate key and primary key	[3 marks]
iv.	Database schema and database instance	[3 marks]

v.　　Select operator and project operator　　　　　　　　　[3 marks]

Question 3:

You are a database administrator at OurBooks company. Your management board requires your input on scenarios they have received on a possible Government client.
Based on the following scenario, determine what type of database you would recommend and briefly explain why.　　　　　　　　　　　　　　　　[10 marks]

i.　　A database that supports the SAP enterprise information System and is used by all government employees.

ii.　　The Ministry of health wants to send a social worker to visit patients at an old age home. The social worker has to record set of data describing patient visits. Only the social worker will use the database.

iii.　　A database that supports the work of five scientists performing research on a new flu drug.

iv.　　A database that supports eight Human resources department officers to share staff related information for all government employees.

Question 4:

Using appropriate examples, describe the following languages

i.　　DDL　　　　　　　　　　　　　　　　　　　　[3 marks]

ii.　　DML　　　　　　　　　　　　　　　　　　　　[3 marks]

iii.　　DCL　　　　　　　　　　　　　　　　　　　　[3 marks]

SECTION C: (40 MARKS)

Question 1:

Table 1 PlayerDetails

PlayerNumber	playerName	Position	Team
2	Rudiger	Defender	Chelsea
7	Kante	Midfielder	Chelsea
9	Lukaku	Forward	Chelsea
3	Tierney	Defender	Arsenal
19	Mount	Midfielder	Arsenal

Given the PlayerDetails table above (Table 1), write SQL commands/ statements to:

i.　　Create Table1　　　　　　　　　　　　　　　　　　[4 marks]

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ii.	Add all the records shown to the table created in (i)	[5 marks]
iii.	Display all the records stored in Table1 in ascending order of PlayerNumber	[3 marks]
iv.	Change PlayerNumber 19's team to Liverpool	[3 marks]
v.	Delete all the details of the players that play for Arsenal	[3 marks]
vi.	Add a new player with the following details	[2 marks]

PlayerNumber	playerName	Position	Team
23	Dabo	Defender	Coventry City

Question 2:

Consider the following Employees relation

EmployeeID	FirstName	Surname	Occupation	HireDate	Salary
1	Sam	Shokongo	Nurse	15 Spet 2005	N$25000
2	Ellouise	liping	Lecturer	23 April 2006	N$35000
3	Geoffrey	#Eixas	Teacher	12 March 2004	N$15000
4	Sam	Beukes	Police Officer	2 Dec 2001	N$55000
5	Issy	Shikongo	Lecturer	2 Dec 2001	N$35000

Using relational algebra, write expressions to

i.	List all employees with a salary of more than N$ 30000	[5 marks]
ii.	Display the EmployeeID, FirstName, Surname and salary of all employees	[5 marks]

Question 3:

Read the scenario below and answer the question that follows:

The publishing company produces books and publications on various subjects from its branches. The company is identified by its name, company registration number and branch code. A book title, ISBN number, edition, publication date identify a book. Subjects are identified by subject code with a subject genre as the other attribute. An author writes books in one particular subject and are identified by their authorID among other attributes. Many authors may write a book and an author can write many books. The company employs editors who are responsible for editing one or more publications. To differentiate the editors, each editor is assigned an editorID and the editor records the date of editing for all publications. A

publication covers one of the specialist subjects and is written by a single author though an author can write many publications.

i.   Draw an ER diagram for the described database.   [10 marks]