



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF COMPUTING AND INFORMATICS**

**DEPARTMENT OF COMPUTER SCIENCE**

<b>QUALIFICATION :</b> BACHELOR OF COMPUTER SCIENCE, BACHELOR OF GEOMATICS, BACHELOR OF LAND ADMINISTRATION, BACHELOR OF GEOINFORMATION TECHNOLOGY	
<b>QUALIFICATION CODE:</b> 07BACS, 07GITB, 07BLAD, 07BGEM	<b>LEVEL:</b> 5
<b>COURSE:</b> DATABASE FUNDAMENTALS	<b>COURSE CODE:</b> DBF510S
<b>DATE:</b> JUNE 2019	<b>SESSION:</b> 1
<b>DURATION:</b> 3 HOURS	<b>MARKS:</b> 100

<b>FIRST OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER(S)</b>	MS. JOSEPHINA MIKKA-MUNTUUMO MS. ROSETHA KAYS MS. SHILUMBE CHIVUNO-KURIA MR. ELIAZER MBAEVA
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**INSTRUCTIONS**

1. This paper consists of 5 sections; A, B, C, D & E.
2. All questions in both sections are to be answered.
3. When writing take the following into account: The style should inform than impress, it should be formal, in third person, paragraphs set out according to ideas or issues and the paragraphs flowing in a logical order. Information provided should be brief and accurate.
4. Please, ensure that your writing is **legible, neat and presentable**.

**THIS QUESTION PAPER CONSISTS OF 6 PAGES** (Including this front page)

**SECTION A: MULTIPLE CHOICE**

**[10 marks]**

- 1) The DBMS acts as an interface between which two components of an enterprise-class database system?
  - A) Database application and the database
  - B) Data and the database
  - C) The user and the database application
  - D) Database application and SQL
  
- 2) If attributes A and B determine attribute C, then it is also true that
  - A)  $A \rightarrow C$
  - B)  $B \rightarrow C$
  - C) (A,B) is a composite determinant
  - D) C is a determinant
  
- 3) The primary key is selected from the
  - A) Composite keys
  - B) Determinants
  - C) Candidate keys
  - D) Foreign keys
  
- 4) The DROP TABLE statement
  - A) Deletes the table structure only
  - B) Deletes the table structure along with the table data
  - C) Works whether or not referential integrity constraints would be violated
  - D) Is not an SQL statement
  
- 5) A single entity having more than one role in the same relationship is an example of
  - A) Binary relationship
  - B) Identifying relationship
  - C) Recursive relationship
  - D) Ternary relationship
  
- 6) Data integrity constraints are used to
  - A) Control who is allowed access to the data
  - B) Ensure that duplicate records are not entered into the table
  - C) Improve the quality of data entered for a specific property (i.e., table column)
  - D) Prevent users from changing the values stored in the table
  
- 7) Which of the following can be addressed by enforcing a referential integrity constraint?
  - A) All phone numbers must include the area code
  - B) Certain fields are required (such as the email address, or phone number) before the record is accepted
  - C) Information on the customer must be known before anything can be sold to that customer
  - D) When entering an order quantity, the user must input a number and not some text (i.e., 12 rather than 'a dozen')
  
- 8) What does ON UPDATE CASCADE ensures?
  - A) Normalization
  - B) Data Integrity
  - C) Materialized Views
  - D) All of the above

- 9) To remove duplicate rows from the results of an SQL SELECT statement, the \_\_\_\_\_ qualifier specified must be included
- A) ONLY
  - B) UNIQUE
  - C) DISTINCT
  - D) SINGLE
- 10) Which one of the following sorts rows in SQL?
- A) SORT BY
  - B) ALIGN BY
  - C) ORDER BY
  - D) GROUP BY

**SECTION B: TRUE/FALSE**

**[10 marks]**

	QUESTIONS	TRUE	FALSE
1	Arithmetic expressions containing a null value evaluate to null.		
2	A foreign key is used to implement relationships between tables.		
3	When the child entity is required, we are restricted from creating a new parent row without also creating a corresponding child row at the same time.		
4	In databases, the terms alternative key and candidate key mean different thing.		
5	Intersection tables are Non ID-dependent on both their parent tables.		
6	In inner join, result is produced by matching rows in one table with rows in another table.		
7	SQL DROP is used to add objects from the database.		
8	A Primary Key is a unique identifier for a table.		
9	All SQL commands must be issued on a single line.		
10	A database is used to store related data.		

**SECTION C: THEORY**

**[25 marks]**

- 1) Explain data redundancy and the type of problems it can lead to in file systems? [4 marks]
- 2) Describe a surrogate primary key and their usefulness in databases? [4 marks]
- 3) Explain multivalued attributes, and show how can they be handled within the database design? [2 marks]
- 4) List any four applications of DBMS. [4 marks]
- 5) The table shown below stores details of students and the overall grade each student obtained in different modules. The Primary Key is (StudentID, ModuleID).

Results

<u>StudentID</u>	StudentName	<u>ModuleID</u>	ModuleName	Grade
S001	Smith	M01	Java	A
S001	Smith	M02	Databases	B
S002	Ford	M01	Java	B

- a) Which Normal Form is the above table and why? [2 marks]
- b) Give two (2) update anomalies that may occur if the table is left un-normalised. Explain any problems that are caused. [4 marks]
- c) Explain what needs to be done in order to remove any potential anomaly in the table. Show how you would normalise the table. [5 marks]

**SECTION D: STRUCTURED QUERY LANGUAGE**

[35 marks]

1) Study the following relation.

CustomerLastName	CustomerFirstName	Phone	CourseDate	AmountPaid	Course	Fee
Johnson	Ariel	206-567-1234	10/1/2013	\$250.00	Adv Pastels	\$500.00
Johnson	Ariel	206-567-1234	3/15/2013	\$350.00	Int Pastels	\$350.00
Green	Robin	425-678-8765	9/15/2013	\$350.00	Beg Oils	\$350.00
Jackson	Charles	360-789-3456	10/1/2013	\$500.00	Adv Pastels	\$500.00
Pearson	Jeffery	206-567-2345	10/1/2013	\$500.00	Adv Pastels	\$500.00
Sears	Miguel	360-789-4567	9/15/2013	\$350.00	Beg Oils	\$350.00
Kyle	Leah	425-678-7654	11/15/2013	\$250.00	Adv Pastels	\$500.00
Myers	Lynda	360-789-5678	10/15/2013	\$0.00	Beg Oils	\$350.00

- a) Write a query to display Customer Names, Contact Number, and Amount Paid for Adv Pastels Course only. [5 marks]
  - b) Change the amount paid by Myers Lynda from \$0.00 to \$500.00. [5 marks]
- 2) Study the following **Employees** table below. Write an SQL script that would CREATE and POPULATE only the first record (row) with your own information by replacing Employee\_Id with your student number, phone\_number with your cellphone number, your true email address etc. Apply appropriate Primary key and other constraints to your table. [10 marks]

EMPLOYEE_ID	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	SALARY	DEPARTMENT_ID
100	King	SKING	515.123.4567	17-JUN-87	AD_PRES	24000	90
101	Kochhar	NKOCHHAR	515.123.4568	21-SEP-89	AD_VP	17000	90
102	De Haan	LDEHAAN	515.123.4569	13-JAN-93	AD_VP	17000	90
103	Hunold	AHUNOLD	590.423.4567	03-JAN-90	IT_PROG	9000	60

3) Use the following Client, Product and Order schema to answer the following question.

**Client**( ClientID, Name, Salary, Position)

**Product** (ProductID, ProductName, quantity, Model)

**Order**(ProductID, ClientID, quantity, price)

a) Write an SQL statement to find the clients who are earning a salary of more than 50000 per month and list the details in descending order of Name. [5 marks]

4) Write SQL statements for the following tables EMP and Dept

**Emp**(empno, ename, job, mgr, hiredate, sal, comm, deptno)

**Dept**(deptno, dname, loc)

a) Display the total salary for each department excluding KING and BLAKE for all the departments with a total salary of more than N\$ 20000. [6 marks]

b) Display ename, hiredate and dname for all employees. Departments in the table dept that are not used in the table emp must be included in the output. [4 marks]

**SECTION E: ER MODEL DIAGRAM**

**[20 marks]**

1) The local city youth league needs a database system to help track children that sign up to play soccer. Data needs to be kept on each team and the children that will be playing on each team, and their parents. Also, data needs to be kept on the coaches for each team. A parent registers their child or children to sign up as a player using a registration form. You need to store team ID number and team name of each team and player ID number, player first name, last name, and player age of all players. A team may or may not have a player. A player must have a team and should belong to only one team. You also need to store Coach ID number, coach first name, coach last name, coach home phone number. A team may have many coaches or may not have a coach. A coach must have only one team assigned to him/her. For each parent, the parent 's ID number, last name, first name, home phone number and home address are kept on the system. A player may have many parents. A parent may have more than one player. Draw the data model described above. State all the assumptions that you make.

\*\*\*\*\*End of Examination\*\*\*\*\*