ΠAMIBIA UΠIVERSITY
OF SCIEΠCE AΠD TECHΠOLOGY

FACULTY OF COMPUTING AND INFORMATICS

DEPARTMENT OF COMPUTER SCIENCE

QUALIFICATION : BACHELOR OF COMPUTER SCIENCE, BACHELOR OF GEOMATICS, BACHELOR OF LAND ADMINISTRATION, BACHELOR OF GEOINFORMATION TECHNOLOGY	
QUALIFICATION CODE: 07BACS, 07GITB, 07BLAD, 07BGEM	**LEVEL: 5**
COURSE: DATABASE FUNDAMENTALS	**COURSE CODE:** DBF510S
DATE: JULY 2019	**SESSION: 2**
DURATION: 3 HOURS	**MARKS:** 100

SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION QUESTION PAPER	
EXAMINER(S)	MS. JOSEPHINA MIKKA-MUNTUUMO MS. ROSETHA KAYS MS. SHILUMBE CHIVUNO-KURIA MR. ELIAZER MBAEVA
MODERATOR:	MR. GEREON KOCH KAPUIRE

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 5 PAGES (Including this front page)

SECTION A: MULTIPLE CHOICE [10 marks]

1) The HAVING clause does which of the following? [1 mark]
   A) Acts like a WHERE clause but is used for groups rather than rows
   B) Acts like a WHERE clause but is used for rows rather than columns
   C) Acts like a WHERE clause but is used for columns rather than groups
   D) Acts EXACTLY like a WHERE clause

2) Which of the following column properties would be used to specify that cells in a column must contain a monetary value? [1 mark]
   A) Null status
   B) Data type
   C) Default value
   D) Data constraints

3) The SQL WHERE clause
   A) Limits the column data that are returned
   B) Limits the row data are returned
   C) Both A and B are correct
   D) Neither A nor B are correct

4) To which normal form(s) does the following marriage relation comply? Marriage(BrideID, GroomID, BrideName, BrideBirthDate, GroomName, GroomBirthdate) [1 mark]
   A) BCNF
   B) 1NF
   C) 1NF and 2NF
   D) 3NF

5) Match the following [1 mark]
   A) Composite attribute ------ i) Attribute whose value is calculated from other attributes
   B) Multivalued Attribute ---- ii) Attribute that can be further subdivided to yield additional attributes
   C) Derived Attribute -------- iii) Attribute that can have more values

   A) A-i, B-ii, C-iii
   B) A-ii, B-i, C-iii
   C) A-ii, B-iii, C-i
   D) A-iii, B-ii, C-i

6) A functional dependency is a relationship between or among? [1 mark]
   A) Tables
   B) Rows
   C) Attributes
   D) Relations

7) When using the SQL INSERT statement? [1 mark]
   A) Rows can be modified according to criteria only
   B) Rows cannot be copied in mass from one table to another only
   C) Rows can be inserted into a table only one at a time only
   D) Rows can either be inserted into a table one at a time or in groups

8) The basic data type char(n) is a _____ length character string and varchar(n) is _____ length character [1 mark]

A) Fixed, equal
B) Equal, variable
C) Fixed, variable
D) Variable, equal

9) What type of join is needed when you wish to include rows that do not have matching values? [1 mark]
A) Equi-join
B) Natural join
C) Outer join
D) All of the mentioned

10) Aggregate functions are functions that take a _____ as input and return a single value. [1 mark]
A) Collection of values
B) Single value
C) Aggregate value
D) Both Collections of values & Single value

SECTION B: TRUE/FALSE   [10 marks]

	QUESTIONS	TRUE	FALSE
1	The SELECT command, with its various clauses, allows users to query the data contained in the tables.		
2	The condition in a WHERE clause can refer to only one value.		
3	Dependency information can never be accidentally lost in a table through deletion anomaly, even if the table is not in 2NF.		
4	SQL does not allow you to use the same table in a subquery as is being used in the outer query (i.e., the query that includes the subquery).		
5	A subquery uses the same syntax as a regular query.		
6	ERDs illustrate the logical structures of DBMS.		
7	VARCHAR2 can be used to store alphanumerical data.		
8	A foreign key is a unique identifier for a database record.		
9	Using an IN operator is an alternative to using a group of OR clauses in a WHERE statement.		
10	The DBMS allows surrogate keys to be changed.		

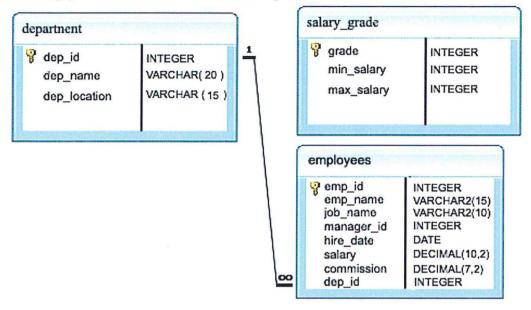## SECTION C: THEORY   [18 marks]

1) What is the difference between a database and a table?   [4 marks]

2) Explain the difference between entity integrity and referential integrity? [4 marks]

3) What is a partial dependency? With what normal form is it associated?   [2 marks]

4) What is an entity supertype and explain the relevance of supertypes in databases? [4 marks]

5) What two conditions must be met before an entity can be classified as a weak entity? Give an example of a weak entity. [4 marks]

SECTION D: STRUCTURED QUERY LANGUAGE [42 marks]

1) The following questions are based on the following relational schema:

department	
🔑 dep_id	INTEGER
dep_name	VARCHAR(20)
dep_location	VARCHAR (15)

salary_grade	
🔑 grade	INTEGER
min_salary	INTEGER
max_salary	INTEGER

employees	
🔑 emp_id	INTEGER
emp_name	VARCHAR2(15)
job_name	VARCHAR2(10)
manager_id	INTEGER
hire_date	DATE
salary	DECIMAL(10,2)
commission	DECIMAL(7,2)
dep_id	INTEGER

a) Write the SQL statements required to create the department and employees' relations, including appropriate primary and foreign key integrity constraints. [13 marks]

b) Write a query in SQL to list the employees who have joined on the following dates 1st May, 20th Feb, and 03rd Dec in the year 1991. [5 marks]

c) Write a query in SQL to list the employees whose salary is more than 3000 after giving 25% increment. [5 marks]

d) Write an SQL statement to delete the 'Marketing' department. [2 marks]

2) Using the table below write SQL instructions to give the following output:

Table: Employees (emp_id, last_name, job_id, hire_date, salary, comm, dept_id)

a) Write a query that will display a list containing unique jobs from the EMPLOYEES table. Name the column heading 'Unique jobs'. [3 marks]

b) Write a query that will display the last names, salary and the first four (4) characters of the department of all employees who earn between 10000 and 15000. [5 marks]

c) Write a query that will display the last names in uppercase and the salaries with a 10% increase for all employees with hire_date not equal to 31 July 2011 or no commission (comm) entered. [5 marks]

3

a) Display the deptno, the job and the number of people with the same job for each department.

[4 marks]

SECTION E [20 marks]

1) Geass Digital Solutions is an end-to-end IT services company offering results-driven services and exceptional customer support. Founded on the principals of helping position clients to achieve real value through process change and technology, Geass is a Namibian locally owned & managed IT Services Company. At Geass, every department employs many employees, but each employee is employed by one department. Some employees are not assigned to any department. A division operates many departments, but each department is operated by one division. An employee may be assigned many projects, and a project may have many employees assigned to it, A project must have at least one employee assigned to it. One of the employees manages each department, and each department is managed by only one employee. One of the employees runs each division, and each division is run by only one employee. Use the following business rules to create a Crow's Foot ERD. Write all appropriate connectivities, attributes and cardinalities in the ERD.

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