

Kigali 19<sup>th</sup> Jan 2024

WORLD MISSION HIGH SCHOOL

L5 SOFTWARE DEVELOPMENT

HOMEWORK OF DATABASE

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**This Exam paper is composed of Three Sections (A, B, C). Follow the instructions given below, and answer the indicated questions for a total of 100marks**

Section **A**: Fifteen (15) questions, all **Compulsory**. **50 marks**

Section **B**: Nine (9) questions, all **Compulsory**. **30 marks**

Section **C**: Six (6) questions, all **Compulsory**. **20 marks**

**SECTION A: ATTEMPT ALL QUESTIONS****/50 MARKS****Question 1:** Define the following terms:**(3marks)**

- a. Data
- b. Database
- c. Information

**Question 2:** What are different database models?**(4marks)****Question 3:** Match the following methods of collecting data with its definitions**(2marks)**

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Method to collect data	Description
1. interview	A. Data can be found in documents. Hard and soft documents as well as web pages should be used.
2. Documentation	B. Instrument of research, which consists of a list of questions along With the choice of answers, printed or typed in a sequence on a form used for acquiring specific information from the respondents
3. Questionnaire	C. Method of data collection involves seeing people in certain setting or place at a specific time and day
4. Observation	D. Method of data collection that involves two or more people exchanging information through series of questions and answers

**Question 4:** Compare non -functional requirements with functional requirements.**(2marks)**

**Question 5:** List the information that the database is required to hold.

**(2marks)**

**Question 6:** What is criteria to follow when naming fields in table? **(2marks)**

**Question 7:** a) What do you understand about data type? **(1mark)**

b) Complete the following table with its datatype. **(3marks)**

Datatype	Description
	Allows whole numbers
	Allows a variable length character string
	Stores time in the format of Hours, Minutes & Seconds

**Question 8:** What is database constraint? **(2marks)**

**Question 9:** a) What is data dictionary? **(1mark)**

b) Outline any three (3) goals of data management system (DBMS).

**(3marks)**

**Question 10:** i) Define database management system. **(1mark)**

ii) List any two (2) database management system software.

**(2marks)**

iii. Show the relationship between data and information.**(2marks)**

**Relationship between data with information**

Data	Information
	-
-	-

**Question 11:** a) Define structured query language (SQL). **(2marks)**

b) List any four (4) rules followed when writing SQL statement.

**(4marks)**

**Question 12:** Outline various data manipulation language commands in SQL and give brief description of their purposes. **(4marks)**

**Question 13:** Which of the following is not a legal expression in SQL?

**(2marks)**

- a. Select FirstName from sales;
- b. Select address FROM sales;
- c. Select \* from sales when price = 70;
- d. Select \* from sales;

**Question 14:** State four (4) examples of SQL clauses. **(4marks)**

**Question 15:** Explain the difference between authorization and authentication within database system. **(4marks)**

**SECTION B: ATTEMPT ALL QUESTIONS** **/30 MARKS**

**Question 16:** Distinguish different database relationships. **(2marks)**

**Question 17:** A garage has a problem of developing an Entity Relationship Diagram and finalizing the design process of database. This garage has no database designer who is familiar with database design tools, you are asked to list all Entity Relationship Diagram components and their meaning.

(3marks)

**Question 18:** a) What is entity relationship diagram?

(1mark)

b) With tangible examples, distinguish strong entity with weak entity.

(2marks)

**Question 19:** A transportation company database schema,

tables PASSENGER (PassengerID, FirstName,Departure,Destination,BusId#),

BUS (BusId, Number\_Of\_sits)

DRIVER (DriverID,FirstName,LastName, PhoneNumber, Licence)

are not related and there are no limitations on fields data, but specifications given by the management team are: only one instance of BUS table may relate to one or many instance(s) of PASSENGER table, and one instance of DRIVER table may relate to only one instance of BUS table. First name field of PASSENGER and Number\_Of\_sits field of BUS cannot be empty,PhoneNumber field of DRIVER is unique

i. Identify primary key(s) and foreign key(s) fields.

(1mark)

ii. List NOT NULL and UNIQUE constraints column(s) in above tables. (1mark)

iii. Compare (3) database constraints.

(3marks)

**Question 20:** The following table is called student:

S002	Mutesa	Gad	SFTDB401	M	70
S023	Berwa	Hope	SFTDP401	F	85
S012	Minani	Charles	SFTPF401	M	74
S034	Mukesh	Dyna	SFTWD401	F	81
S025	Teta	Betty	SFTWA401	F	74

S041	Keza	Alice	SFTIP401	F	90
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Build SQL statements for:

- a) Showing all courses. **(1mark)**
- b) Finding number of students in the above table. **(1mark)**
- c) Displaying all students whose marks are between 80 and 90 and give the output. **(1mark)**
- d) Retrieving all students whose marks is below 75 and give the output. **(1mark)**
- e) Displaying all staff whose first names are started by letter “m” **(1mark)**

**Question 21:** Here is a database with its table Staff:

Town	TARGET	SALES
Rubavu	323 021	168 240
Rusizi	455 500	557 030
Kigali	860 470	753 420
Musanze	458 050	763 191
Muhanga	725 123	358 519

- a) Examine SQL statement to show all cities in **Staff** table. **(1mark)**
- b) Decide SQL statements to drop **Staff** table. **(1mark)**

**Question 22:** a) Explain a view. **(1mark)**

- b) Outline the syntax of view in SQL **(1mark)**
- c) Why do we need views within database? **(1mark)**

**Question 23:** a) Match the definition with its corresponding clause.

**(2marks)**

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|-------------|--|
| 1. HAVING   | a) Filters groups subject to some conditions           |
| 2. ORDER BY | b) Specifies the sorting type of the output            |
| 3. SELECT   | c) Forms collections of rows with same<br>column value |
| 4. FROM     | d) Specifies table(s) to be used                       |
| 5. GROUP BY | e) Specifies with columns are to appear in output      |
| 6. WHERE    | f) filters rows  |

b) Match appropriately the SQL operators with their corresponding descriptions (indicate the letter corresponding to the right answer only)

**(3marks)**

SQL Operators	Description
1. SQL Arithmetic Operator	a. They can perform arithmetical operations on numeric operands involved
2. SQL Comparison Operator	b. They perform bit manipulations between two integer expressions of the integer data type category
3. SQL Assignment operator	c. They are those that are true or false. They return a true or false to combine one or more true or false values
4. SQL Bitwise Operator	d. It is a mathematical symbol which is used to compare two values. The result can be TRUE, FALSE or unknown

5. SQL Logical Operator	e. It assigns a value to a variable or of a column or field of a table
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c) Answer the following statements by true(T) or false(F) **(2marks)**

- i. SQL is not case insensitive
- ii. The SELECT command, with its various clauses, allows users to query the data contained in the tables
- iii. The condition in WHERE clause can refer to only one value

**Question 24:** Refer to the following given table"table\_name: Drivers,  
Database\_name:"RTFC" **(2marks)**

Driv_id	Driv_names	Driv_location	Driv_phone
RTFC001	MUGISHA King	Nyarugenge	0766123456
RTFC002	MAHORO Khadija	Rusizi	0734339999

- a. Write SQL command used to create the database.
- b. Write SQL command used to create the table above.
- c. Write SQL command used to enter those records into table as shown above
- d. What is the meaning of asterisk (\*) in the SQL command?

**SECTION C. ATTEMPT ALL QUESTIONS /20 MARKS**

**Question 25:** Based on table persons given below, answer the questions below:

**(2marks)**



<b>P_id</b>	<b>FirstName</b>	<b>LastName</b>	<b>City</b>
001	Ntakwasa	Phiona	KIGALI
002	Uwanziza	Eric	HUYE
003	Ishimwe	Natacha	RUSIZI

- Write SQL command used to select the persons living in a city that starts with “R” from the table above
- Write SQL command used to select the persons whose FirstName ends with an” A” from the table above
- Write SQL command used to select the persons with a last name that contains the pattern “ION” from the persons table
- Write SQL command that will create the table given above by assigning the primary key on the two first columns.

**Question 26:** Discuss different database design levels or phases. **(2marks)**

**Question27:**

- Explain metadata **(1mark)**
- Compare four (4) metadata **(2marks)**
- What does data redundant mean? **(0.5mark)**
- How can you minimize data redundancy into a database? **(0.5mark)**

**Question 28:** a) We have the following database schema with its tables which are tables PASSENGER (PassengerID, FirstName,Departure,Destination,BusId),

BUS (BusId,Number\_Of\_sits)

DRIVER (DriverID,FirstName,LastName, PhoneNumber, Licence)

You are assigned to develop their data dictionary. **(2marks)**

- b) Differentiate three (3) components of database management system.(2marks)
- c) State at least two (2) advantages and 2 disadvantages of using DBMS.

(2marks)

**Question 29:** Below is a selection from the person's table

(2marks)

PersonID	LastName	FirstName	City
1	Cindy	Byusa	Kigali
2	Lica	Bikora	Karongi
3	Tania	Teta	Karongi
4	Fany	Kazungu	Ngororero
5	Emmy	Mutesa	Karongi

- a) Using SQL statement, create the above table
- b) Using SQL statement insert the record in the above table
- c) Using SQL statement, Update FirstName of BYUSA to MINANI
- d) Using SQL statement, delete the record where person identification is 4.

**Question 30:** a) Give any four (4) types of database user and explain them

(1mark)

- b) Give the main functions of the database administrator.

(1mark)

**END OF Homework!**