A7-R5.1 : DATABASE TECHNOLOGIES

DURATION : 03 Hours   **MAXIMUM MARKS : 100**

OMR Sheet No. :

Roll No. :   **Answer Sheet No. :**

Name of Candidate : _____ ; **Signature of Candidate :** _____

INSTRUCTIONS FOR CANDIDATES :

- Carefully read the instructions given on Question Paper, OMR Sheet and Answer Sheet.

- Question Paper is in English language. Candidate has to answer in English language only.

- There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.

- **PART ONE** is Objective type and carries **40** Marks. **PART TWO** is Subjective type and carries **60** Marks.

- **PART ONE** is to be answered in the **OMR ANSWER SHEET** only, supplied with the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book for **PART TWO**.

- Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the Answer Sheet for **PART ONE** is returned. However, Candidates who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the Answer Sheet for **PART ONE** to the Invigilator.

- **Candidate cannot leave the examination hall/room without signing on the attendance sheet and handing over his/her Answer Sheet to the invigilator. Failing in doing so, will amount to disqualification of Candidate in this Module/Paper.**

- After receiving the instruction to open the booklet and before answering the questions, the candidate should ensure that the Question Booklet is complete in all respects.

DO NOT OPEN THE QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO.

PART ONE

(Answer all the questions; each question carries ONE mark)

1. **Each question below gives a multiple choice of answers. Choose the most appropriate one and enter in the "OMR" answer sheet supplied with the question paper, following instructions therein.**

(1x10)

1.1 In a relational database, what is a table ?

(A) A graph of data points

(B) A collection of related records

(C) A calculation formula

(D) A diagram of database structure

1.2 What is the primary key in a relational database ?

(A) A key used to open the database

(B) A key used for encryption

(C) A unique identifier for each record in a table

(D) A foreign key in a different table

1.3 In a three-tier architecture, what does the presentation tier primarily handle ?

(A) Data storage

(B) User interface and user interaction

(C) Database management

(D) Server communication

1.4 What is the primary disadvantage of a three-tier architecture when compared to a two-tier architecture ?

(A) Lack of scalability

(B) Increased complexity

(C) Slower data access

(D) Reduced security

1.5 What are Codd's Rules ?

(A) A set of guidelines for writing efficient SQL queries.

(B) A set of principles defining the properties of a relational database management system (RDBMS).

(C) A set of rules for normalizing a database schema.

(D) A set of rules for designing user interfaces for databases.

1.6 What is the primary goal of database normalization ?

(A) To eliminate redundancy and avoid data duplication.

(B) To make the database as large as possible.

(C) To speed up database query performance.

(D) To store data in its original, unaltered form.

1.7 What does a diamond shape in an ER diagram represent ?

(A) An entity

(B) A relationship

(C) An attribute

(D) A primary key

1.8 In the context of mapping an ER diagram to database tables, what is an entity type ?

(A) A unique identifier for each table.

(B) A relationship between tables.

(C) A set of tables that store data.

(D) A representation of a category of objects or concepts.

1.9 Which SQL command is used to create a new database in MariaDB ?

(A) CREATE TABLE

(B) CREATE DATABASE

(C) CREATE SCHEMA

(D) CREATE INDEX

1.10 Which MariaDB command is used to change the values in a column ?

(A) ALTER

(B) MODIFY

(C) UPDATE

(D) CHANGE

2. **Each statement below is either TRUE or FALSE. Choose the most appropriate one and enter your choice in the "OMR" answer sheet supplied with the question paper, following instructions therein.**

(1x10)

2.1 A database management system (DBMS) is software that enables the creation, maintenance, and use of databases.

2.2 In a three-tier architecture, the separation of concerns between layers helps improve scalability and maintainability.

2.3 A foreign key in an RDBMS is a field that establishes a link between two tables, typically linking a primary key in one table to a corresponding field in another table.

2.4 It's possible for a table to be in Third Normal Form (3NF) and still contain partial dependencies.

2.5 MariaDB is not compatible with applications and tools designed for MySQL.

2.6 MariaDB provides the "INSERT INTO" statement to update existing data in a table.

2.7 MariaDB allows you to use the "ROLLBACK" statement to undo changes made during a transaction.

2.8 An ER diagram is a graphical representation of a database schema, showing entities, attributes, and relationships.

2.9 A primary key can contain NULL values to represent missing or unknown data.

2.10 The relational model is the only data model used in modern database management systems.

3. **Match words and phrases in column X with the closest related meaning / words(s) /phrase(s) in column Y. Enter your selection in the "OMR" answer sheet supplied with the question paper, following instructions therein.** (1x10)

	X		Y
3.1	DBMS	**A**	To delete a table
3.2	Conceptual View	**B**	Non-relational type of databases
3.3	Foreign Key	**C**	an interactive JavaScript interface
3.4	Sql Commands	**D**	Use to store, manage and retrieve data
3.5	Order By	**E**	Describes the structure of the whole database
3.6	Mongo Shell	**F**	To retrieve zero or more rows
3.7	1NF	**G**	Refers to the PRIMARY KEY in another table.
3.8	NoSql	**H**	Sort the result set
3.9	Select	**I**	To communicate with the database
3.10	drop	**J**	Consists of atomic values
3.11		**K**	used to identify unique record
3.12		**L**	Delete specific row from table
3.13		**M**	Highest level of data abstraction

4. **Each statement below has a blank space to fit one of the word(s) or phrase(s) in the list below. Choose the most appropriate option, enter your choice in the "OMR" answer sheet supplied with the question paper, following instructions therein.** (1x10)

A	Primary Key	B	Curly braces { }	C	CURRENT_DATE	D	Normalization
E	SQL (Structured Query Language)	F	Data integrity	G	Indexing	H	Having
I	Mysql	J	Concat	K	Link list	L	Data Manipulation language
M	Grouping						

4.1 DBMS improves _____ by reducing data redundancy and providing data consistency.

4.2 The process of reorganizing data in a database to eliminate data redundancy is known as _____

4.3 _____ is a widely used relational database management system (RDBMS) known for its open-source nature and is often used in web applications.

4.4 _____ is a data structure technique used to locate and quickly access data in databases.

4.5 In the Second Normal Form (2NF), all non-key attributes must be functionally dependent on the _____.

4.6 In JSON, data is represented as key-value pairs enclosed in_____.

4.7 The primary language used to interact with MariaDB for tasks such as querying and data manipulation is _____.

4.8 You can use the _____ function to apply a filter to the groups generated by GROUP BY.

4.9 The SQL _____ function is used to concatenate two or more strings together.

4.10 The SQL _____ function is used to retrieve the current date.

PART TWO

(Answer any FOUR Questions)

5. (a) What are the main characteristics of Database Management System ?

   (b) What are Derived Attributes. Give example.

   (c) Explain Super Key with example.

   (d) What are the basic SQL DML commands? Give proper syntax of each.

   (3+3+4+5)

6. (a) Give the syntax for creating stored procedures.

   (b) Explain architecture of a database

   (c) Explain various characteristics of relational database.

   (d) What is foreign key.

   (2+5+5+3)

7. (a) Explain alter command.

   (b) What is natural join ? When it is used.

   (c) Write differences between relational and NoSQL database.

   (d) What steps are involved in converting a database from 2NF to 3NF? Give example.

   (2+3+5+5)

8. (a) Explain architecture of MongoDB.

   (b) How can you filter results using the WHERE clause in a SQL query ?

   (c) When might you choose a document-oriented database like MongoDB over a relational database ?

   (d) How does a Primary Key Constraint differ from a Unique Constraint ?

   (5+3+4+3)

9. (a) What are the basic structures in JSON, and how are they represented ?

   (b) How do you use ORDER BY with a single column in a SQL query ?

   (c) What are the common types of constraints in a relational database ?

   (d) How do you choose the right database for a project ?

   (5+3+4+3)

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