# A7-R5 : DATABASE TECHNOLOGIES

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

OMR Sheet No. : ☐☐☐☐☐

Roll No. : ☐☐☐☐☐☐                    Answer Sheet No. : ☐☐☐☐☐☐

Name of Candidate : _____ ; Signature of Candidate : _____

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## 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 respect.

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## 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. A Database Management System (DBMS) is :
(A) Collection of interrelated data
(B) Collection of programs to access data
(C) Collection of data describing one particular enterprise
(D) All of the above

1.2 In an Entity-Relationship Diagram Rectangles represents :
(A) Entity sets
(B) Attributes
(C) Database
(D) Tables

1.3 Which of the following is not a Schema ?
(A) Database Schema
(B) Physical Schema
(C) Critical Schema
(D) Logical Schema

1.4 The number of entities associated in relationship is called as it's _____.
(A) Cardinality
(B) Degree
(C) Tuples
(D) Entity

1.5 In the _____ Normal form, a composite attribute is converted to individual attributes.
(A) First
(B) Second
(C) Third
(D) Fourth

1.6 In RDBMS, Data is presented as a collection of _____.
(A) Table
(B) Attributes
(C) Relations
(D) Entities

1.7 If an attribute of a composite key is dependent on an attribute of the other composite key, normalization called _____ is needed.
(A) DKNF
(B) BCNF
(C) Fourth
(D) Third

1.8 The _____ operator preserves unmatched rows of the relations being joined.
(A) Inner join
(B) Outer join
(C) Union
(D) Union join

1.9 In a relational schema, each tuple is divided into fields called :
(A) Relations
(B) Queries
(C) Domains
(D) All of the above

1.10 _____ defines the structure of a relation which consists of a fixed set of attribute domain pairs.
(A) Instance
(B) Program
(C) Super Key
(D) Schema

**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 Data Manipulation Language enables users to retrieve information stored in database.

2.2 Authorization for data access is not a function of DBA.

2.3 A logical schema is a standard way of organizing information into accessible parts.

2.4 LIKE predicate is used to determine whether of a table contains duplicate rows.

2.5 Domain integrity is to ensure that only valid values can be assigned to each data items.

2.6 Semi-join operator is basically a join followed by a project on the attributes of first relation.

2.7 Project is a binary operator in relational algebra.

2.8 GROUP BY clause specifies a search condition for a group or an aggregate.

2.9 There are three levels of abstraction in DBMS.

2.10 ALTERNATE KEY is NOT a type of SQL constraint.

3. **Match words and phrases in column X with the closest related meaning / word(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** | Entity-Relationship model | **A.** | Drop |
| **3.2** | Top-to-bottom relationship | **B.** | Data Model |
| **3.3** | Eliminate duplicate rows | **C.** | Data dictionary |
| **3.4** | Candidate key | **D.** | Hierarchical schema |
| **3.5** | DDL statement | **E.** | View |
| **3.6** | Minimal data redundancy | **F.** | Record |
| **3.7** | Metadata | **G.** | Relationship between attributes |
| **3.8** | Virtual table | **H.** | Surrogate key |
| **3.9** | Row | **I.** | Improved data consistency |
| **3.10** | Functional dependency | **J.** | DISTINCT |
| | | **K.** | Insert |
| | | **L.** | Network Schema |
| | | **M.** | Delete |

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 | Weak entity | B | Query | C | Schema | D | Constraint |
| E | Normalization | F | Select | G | Alter | H | GUI |
| I | DBA | J | Relation | K | DBMS | L | Tuple |
| M | Sub Schema | | | | | | |

4.1 _____ is the process of organizing data into related tables.

4.2 _____ does not have a distinguishing attribute if its own and mostly are dependent entities, which are part of some another entity.

4.3 _____ is used to retrieve tuples from the relation.

4.4 _____ is a DDL statement.

4.5 _____ defines rules regarding the values allowed in columns and is the standard mechanism for enforcing database integrity.

4.6 The relational model is based on the concept that data is organized and stored in two-dimensional tables called _____.

4.7 The main interface that a naive user uses is a form interface using _____.

4.8 Retrieval of data is done by using a _____.

4.9 _____ is responsible for overall control of the database system.

4.10 The overall description of a database is called a _____.

**PART TWO**

**(Answer any FOUR Questions)**

**5.** (a) What is a database management system ? What are its advantages ?

(b) Two tables Book and Price are displayed below.

| Book Table | | Price Table | |
|---|---|---|---|
| id | name | id | Price |
| 1 | MariaDB Book1 | 1 | 250 |
| 2 | MariaDB Book2 | 2 | 250 |
| 3 | MariaDB Book3 | 3 | 220 |
| 4 | MariaDB Book4 | 4 | 190 |
| 5 | MariaDB Book5 | | |

Write the SQL Queries for the following :

(i) Display the book with the name 'MariaDB Book4'

(ii) Display all the books except 'MariaDB Book4'

Using the JOIN operations.

(iii) Display the list of all the books with their prices. The books should be displayed even if there prices are not mentioned.

(iv) Display the list of books whose price has been defined.

**(7+8)**

**6.** (a) Differentiate between physical and logical data independence.

(b) What are the three conditions for determining whether a decomposition of a relation into sub-relations is lossless or lossy. Explain with an example.

**(6+9)**

**7.** (a) Discuss the three level DBMS architecture in detail.

(b) What do you understand by cardinality of a relationship ? Explain with example.

**(8+7)**

**8.** (a) Explain the constraints for decomposing relations during normalization process with example.

(b) Explain different datatypes supported by MariaDB.

**(10+5)**

**9.** Define functional dependencies. Discuss different types of functional dependencies with example.

**(15)**

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**SPACE FOR ROUGH WORK**