Answer key

Touchpad MODULAR SQL

1. Introduction to DBMS

Exercise

A. 1. c 2. a 3. b 4. d 5. d

B. 1. T 2. F 3. T 4. F 5. F

C. 1. DBMS 2. field 3. E.F. Codd 4. record 5. Master Table

D. 1. A database is defined as an organised collection of data that can be visualised as a container of information.

2. In a relational database, when two tables are linked through a common field, the common field in the second table, which references the primary key of the first table, is called a foreign key.

3. SQL stands for Structured Query Language. It is the standard language for managing relational databases and performing various operations on the data in the tables. It would enable us to store, retrieve, and manipulate data in the form of tables.

4. A table is a collection of logically related records. The multiple records of a database are arranged together in a tabular structure to make a table. A table is made of rows and columns.

5. A record is a collection of multiple data which is stored in related fields that can be treated as a single unit. It represents the data which is entered in a set of different fields which are related to a particular item.

E. 1. A Database Management System (DBMS) is a software package that controls the creation, maintenance, and use of a database. It performs the tasks of maintaining databases so that the information is readily available. It helps to manage the data of different fields like banks, offices, railways, airlines, etc.

2. Microsoft Access, Microsoft SQL Server, Oracle, MySQL, IBM DB2, PostgreSQL, etc. are some of the most commonly used relational database management systems.

3. Primary key is a field which is used to uniquely identify records in a database. It is a unique field and it cannot be left blank. There can be only one primary key in a table. On the other hand, in a relational database, when two tables are linked through a common field, the

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common field in the second table, which references the primary key of the first table, is called a foreign key.

4. Three features of SQL are as follows:
   - It has very high speed.
   - It is easy to use.
   - It is available free of cost.
5. A Database Management System (DBMS) is a software package that controls the creation, maintenance, and use of a database. It performs the tasks of maintaining databases so that the information is readily available. Whereas, the software package that is used to handle relational databases is known as the Relational Database Management System (RDBMS).

F. 1. Primary Key

2. SELECT, UPDATE, INSERT INTO and DELETE commands she can use.

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Do yourself.

2. Introduction to DBMS

EXERCISE

A.	1. d	2. b	3. c	4. b	5. b
B.	1. T	2. T	3. T	4. F	5. T
C.	1. SQL	2. Table	3. One	4. Modifying	5. Constraints

D. 1. A table is a collection of organised data in the form of rows and columns.

2. The default constraint is used to specify a default value for a column.
3. The syntax of the DROP TABLE command is as follows:

   DROP TABLE table_name;
4. Syntax to add a column is as follows:

   ALTER TABLE table_name

   ADD [COLUMN] column_name datatype [FIRST|AFTER existing_column];
5. The CHECK constraint restricts the value range that can be placed in a column.

E. 1. Perform the following steps to install MySQL:

Step 1 Once the setup file is downloaded, double-click on it to start the installation.

Step 2 Click on the Next button with the default settings.

Step 3 Click on the Next button.

Step 4 Click on the Execute button.

Step 5 When the installation completes, click on the Next button twice.

Step 6 Click on Next button twice.

Step 7 Type the password for the root user.

Step 8 Click on the Next button twice.

Step 9 Click on the Execute button.

Step 10 Click on the Finish button.

2. The constraints used in MySQL are NULL, NOT NULL, PRIMARY KEY, UNIQUE, DEFAULT, CHECK.
3. The DROP TABLE command is used to delete a table from a database. The syntax of the DROP TABLE command is as follows:

   DROP TABLE table_name;
4. The MODIFY COLUMN clause is used with the ALTER TABLE command to change the data type of a column. The syntax is as follows:

   ALTER TABLE table_name MODIFY COLUMN column_name datatype;
5. Some of the data types in SQL are listed below:

DATA TYPE	DESCRIPTION
INTEGER or INT	Integer number (no decimal).
CHAR (n)	Character string with fixed length of n.
VARCHAR (n)	Character string with variable length of n.
DECIMAL (p,s)	Where 'p' is precision value and 's' is scale value.
DATE	Stores YY/MM/DD values.

F. 1. Anaya can use the following query to add one more field in the table:

   ALTER TABLE table

   ADD [COLUMN] column_name datatype [FIRST|AFTER existing_column];
2. Viraj can use the CHECK constraint because CHECK constraint restricts the value range that can be placed in a column.

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3. Handling Records in MySQL

Exercise

A. 1. b 2. d 3. a 4. c 5. b

B. 1. T 2. F 3. F 4. F 5. F

C. 1. Insert 2. Select 3. % 4. DISTINCT 5. Primary Key

D. 1. The SELECT command retrieves zero or more rows from a table. It helps us to join information from different tables and filter specific information as per the required criteria.

2. The syntax of the DISTINCT clause is as follows:

   SELECT DISTINCT <column_name > FROM <table_name>;

3. SQL statements consist of reserved words or characters used to perform arithmetical operations, comparisons, etc. These reserved words or characters are called 'Operators'.

4. The LIKE operator in SQL searches for a character string that matches the specified pattern using wildcards in a column.

5. The syntax to use the SELECT command:

   SELECT * FROM table_name;

E. 1. The INSERT command is used to insert records into a table. For example,

   INSERT INTO Students VALUES (10001, 'Amit', 'Sharma', 450, 'E-458, Vikas Puri, New Delhi');

2. We can update records in a table by using the UPDATE command. The syntax of the UPDATE command is:

   UPDATE table_name SET field_change=value WHERE field_criteria=value;

3. (This question was printed incorrectly in the book, please correct it in your textbook)

   Explain any five relational operators with example.

Operator	Description	Example
=	Checks if value of 'a' is equal to value of 'b'. If yes, condition becomes true, else false.	(a = b) is false
!=	Checks is value of 'a' is not equal to value of 'b'. If yes, condition becomes true, else false.	(a! = b) is true
<>	Checks if value of 'a' is equal to value of 'b' or not. If yes, condition becomes true, else false.	(a <> b) is false
<	Checks if value of 'a' is less than value of 'b'. If yes, condition becomes true, else false.	(a < b) is false
>	Checks if value of 'a' is greater than value of 'b'. If yes, condition becomes true, else false.	(a > b) is true

4. (This question was printed incorrectly in the book, please correct it in your textbook)

   Explain about BETWEEN operator.

   Ans. The BETWEEN operator is used to indicate a range which otherwise is done using relational operator.

5. The SELECT command retrieves zero or more rows from a table. For example,

   ```
   SELECT * from Students;
   ```

   The UPDATE command, on the other hand, is used to change the inserted records into a table.

   ```
   UPDATE Students SET Marks = 485 where StudentID = 10002;
   ```

F. 1. She can use the INSERT command to do so.

2. She can use the = operator with the WHERE clause.

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Test Sheet 1

(Based on chapters 1 to 3)

Section A

A. 1. a 2. d 3. d
4. b 5. b 6. d

B. 1. T 2. F 3. T
4. T 5. F 6. T

C. 1. Edgar F. Codd 2. Master Table 3. Table
4. Constraints 5. Primary key 6. %

Section B

A. 1. In a relational database, when two tables are linked through a common field, the common field in the second table, which references the primary key of the first table, is called a foreign key.

2. A record is a collection of multiple data which is stored in related fields that can be treated as a single unit.

3. A table is a collection of logically related records.

4. The syntax of the DROP TABLE command is as follows:

   DROP TABLE table_name;

5. SQL statements consist of reserved words or characters used to perform arithmetical operations, comparisons, etc. These reserved words or characters are called 'Operators'.

6. The SELECT command retrieves zero or more rows from a table. It helps us to join information from different tables and filter specific information as per the required criteria.

B. 1. (This question was printed incorrectly in the book, please correct it in your textbook)

What do you mean by a database?

Ans. A database is defined as an organised collection of data that can be visualised as a container of information.

2. The DELETE command is used to remove records from a table. The INSERT command is used to insert records in a table.

3. Perform the following steps to install MySQL:

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Step 9 Click on the Execute button.

Step 10 Click on the Finish button.

4. The UPDATE command is used to change the existing records in a table. The syntax of the UPDATE command is:

UPDATE table_name SET field_change=value WHERE field_criteria=value;

5. (This question was printed incorrectly in the book, please correct it in your textbook)

Explain any five relational operators with example.

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6. The SELECT command retrieves zero or more rows from a table. For example,

```
SELECT * from Students;
```

The UPDATE command, on the other hand, is used to change the inserted records into a table.

```
UPDATE Students SET Marks = 485 where StudentID = 10002;
```

4. More on MySQL

Exercise

A. 1. b

2. (This question was printed incorrectly in the book, please correct it in your textbook)

Which of the following functions is helpful in finding the maximum value in the given set of values?

a. MAX() b. MIN()

c. COUNT() d. NOW()

Ans. a

3. c 4. b 5. d

B. 1. F 2. F 3. T 4. F 5. T

C. 1. order by 2. having 3. where 4. sum() 5. date

D. 1. The GROUP BY clause will be very helpful in making subject wise subgroups to understand the data better.

2. SELECT name, price FROM products WHERE code = 'P06';

3. COUNT(), AVG(), MAX(), MIN(), and SUM() are the aggregate functions.

4. Function is a set of predefined commands that perform specific operation to return a value to the program.

5. The NOW() function returns the exact time at which the function executes as per system clock.

E. 1. i. SELECT * FROM TRANSACTION WHERE TYPE = 'Deposit';

ii. SELECT ANO, TYPE, AMOUNT FROM TRANSACTION WHERE MONTH(DOT) = 1;

iii. SELECT MIN(DOT) AS First_Transaction_Date FROM TRANSACTION WHERE ANO = 105;

2. (This question was printed incorrectly in the book, please correct it in your textbook)

Write the output of the following queries:

i. SELECT ANAME FROM ACCOUNT WHERE ADDRESS NOT IN ('HYDERABAD', 'BANGALORE');

Ans.

ANO	ANAME	AMOUNT	DOT
103	Ali Reza	10000	2022-10-22

ii. SELECT ANO FROM TRANSACTION;

Ans.

ANAME
Rohan Gupta
Simran Kaur

iii. SELECT COUNT(*), SUM(AMOUNT) FROM TRANSACTION WHERE DOT <= '2022-06-01' AND DOT

>= '2022-10 -22';

Ans.

ANO
101
103
102
103
102

iv. SELECT ANO, COUNT(*), SUM(AMOUNT) FROM TRANSACTION GROUP BY TYPE AND HAVING COUNT > 2;

ANO	Transaction_Count	Total_Amount
102	3	140000

3. (This question was printed incorrectly in the book, please correct it in your textbook)

Differentiate between Group by and order by Clause?

Ans. The GROUP BY clause will be very helpful in making subject wise subgroups to understand the data better. On the other hand, the ORDER BY keyword is used to sort the values in ascending or descending order.

4. (This question was printed incorrectly in the book, please correct it in your textbook)

Explain the concept of alias with the help of example.

Ans. Aliases are used to give a table or column, a temporary name. Aliases are often used to make column names more readable and presentable. For example, if you want to display the column Name from the table customer with another name like Customer Name, then we can use the concept of aliasing.

5. (This question was printed incorrectly in the book, please correct it in your textbook)

Differentiate between DATE, MONTH and YEAR functions.

Ans.

DATE ( )	MONTH ( )	YEAR ( )
Extracts the date part of a date or complete date from the expression	Extract the month from the date passed	Returns the year out of the date

F. (This question was printed incorrectly in the book, please correct it in your textbook)

Ananya has created a table of her five friends with their first name, last name, roll number and marks. Now, she wants to retrieve the first name and second name as one column. Which function should she use to do so?

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5. Advanced Features of MySQL

EXERCISE

A. 1. b 2. d 3. b 4. b 5. a

B. 1. F 2. F 3. T 4. F 5. F

C. 1. WHERE 2. Equi join 3. INNER JOIN 4. CREATE VIEW 5. database

D. 1. A view is a temporary table which is created on the basis of table. In MySQL, the lifetime of a view is not permanent by default.

2. An index makes the process of search faster and efficient. It's the helps the pointer to reach the desired record rather than sequentially going through each record one by one. It is a mechanism which help to quickly retrieve a record from a table or a view.

3. A JOIN clause is used to combine rows or two tables based on at least one between them. The process in which we extract data from multiple tables is known as join. The tables can be joined physically or virtually using where clause. For example,

   SELECT Name, age, fee, Transport FROM Student, Fee WHERE (student.stud_id = Fee.Stud_id);

4. The Cartesian product is also known as cross product. It is denoted by X. The degree of the new relation will be the sum of the degrees of two relations in which cross product is executed.

   A= {100,200,300} B = {Red, Green, Blue}

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Find A X B

C = A X B

(100 red)

(200 Green)

(300 Blue)

Columns after Cartesian Product 1 + 1 = 2

Rows after Cartesian Product 3 X 3 = 9

5. We can have three types of joins in SQL

   i. Cartesian Product

   ii. Equi Join

   iii. Natural Join

E. 1. Do it yourself.

2. The concept of Indexing normally helps the search engines to do the searching job faster.

3. Views can be used for security purposes. View doesn't contain data of its own it only holds the data permanently. As view is deleted or edited, it has no impact on main table and its data. The changes done in view have no effect on original data.

F. Rahul has to keep in mind the following rules before updating views:

- Create view should not have Group by and order by clause.
- The SELECT statement should not have the DISTINCT keyword.
- There should be no NULL values in Views.
- Creation of views should not use nested queries or complex queries.

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Test Sheet 2

(Based on chapters 4 & 5)

Section A

A. 1. b 2. c 3. d

4. d 5. b 6. b

B. 1. F 2. T 3. T

4. F 5. F 6. F

C. 1. order by 2. WHERE 3. DATE 4. same

5. Cartesian product 6. =

Section B

1. The GROUP BY clause will be very helpful in making subject wise subgroups to understand the data better.
2. COUNT(), AVG(), MAX(), MIN(), and SUM() are the aggregate functions.
3. The NOW() function returns the exact time at which the function executes as per system clock.
4. An index makes the process of search faster and efficient. It's the helps the pointer to reach the desired record rather than sequentially going through each record one by one. It is a mechanism which help to quickly retrieve a record from a table or a view.
5. The Cartesian product is also known as cross product. It is denoted by X. The degree of the new relation will be the sum of the degrees of two relations in which cross product is executed.

   A= {100,200,300} B = {Red, Green, Blue}

   Find A X B C = A X B

   (100 red)

   (200 Green)

   (300 Blue)

   Columns after Cartesian Product 1 + 1 = 2

   Rows after Cartesian Product 3 X 3 = 9