
🧠 10 Theoretical MySQL Questions and Answers

1. What is MySQL?

Answer:
MySQL is an **open-source relational database management system (RDBMS)** that uses **Structured Query Language (SQL)** to store, manage, and retrieve data efficiently.

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2. What is the difference between SQL and MySQL?

Answer:

- **SQL:** A **language** used to interact with databases.
- **MySQL:** A **database management system** that implements SQL.

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3. What are the different types of SQL commands?

Answer:

1. **DDL (Data Definition Language):** CREATE, ALTER, DROP
2. **DML (Data Manipulation Language):** INSERT, UPDATE, DELETE
3. **DCL (Data Control Language):** GRANT, REVOKE
4. **TCL (Transaction Control Language):** COMMIT, ROLLBACK, SAVEPOINT
5. **DQL (Data Query Language):** SELECT

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4. What is a Primary Key?

Answer:
A **Primary Key** uniquely identifies each record in a table.

- It **cannot be NULL**
- It must be **unique**
- Each table can have only **one Primary Key**

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5. What is the difference between Primary Key and Foreign Key?

Answer:

- **Primary Key:** Uniquely identifies a record within the same table.
- **Foreign Key:** Establishes a link between two tables (refers to Primary Key of another table).

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6. What is normalization?

Answer:
Normalization is the process of organizing data to **reduce redundancy** and **improve data integrity**.
Common normal forms: 1NF, 2NF, 3NF, BCNF.

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7. What is a JOIN in MySQL?

Answer:
A **JOIN** is used to combine rows from two or more tables based on a related column.
Types:

- INNER JOIN
- LEFT JOIN
- RIGHT JOIN
- FULL JOIN (simulated using UNION)

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8. What is the difference between WHERE and HAVING?

Answer:

- **WHERE**: Used to filter rows **before** grouping.
- **HAVING**: Used to filter groups **after** applying aggregate functions.

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9. What are indexes in MySQL?

Answer:
Indexes are used to **speed up search queries** by allowing the database to find rows faster.
However, they **increase storage** and **slow down INSERT/UPDATE** operations.

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10. What is the difference between DELETE, TRUNCATE, and DROP?

Answer:

Command	Action	Can Rollback	Removes Structure?
DELETE	Removes specific rows	✅ Yes	❌ No
TRUNCATE	Removes all rows	❌ No	❌ No
DROP	Deletes entire table	❌ No	✅ Yes

💻 **10 Practical MySQL Questions and Answers**

1. Create a database named college_db.

```
CREATE DATABASE college_db;
```

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2. Create a table students with columns (id, name, age, city).

```
CREATE TABLE students (
  id INT PRIMARY KEY,
  name VARCHAR(50),
  age INT,
  city VARCHAR(50)
);
```

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3. Insert records into the students table.

```
INSERT INTO students (id, name, age, city)
VALUES (1, 'Gaurav', 21, 'Ambikapur'),
      (2, 'Ravi', 22, 'Raipur'),
      (3, 'Asha', 20, 'Bilaspur');
```

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4. Retrieve all records from the students table.

```
SELECT * FROM students;
```

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5. Retrieve names of students older than 21.

```
SELECT name FROM students WHERE age > 21;
```

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6. Update the city of student with id = 1.

```
UPDATE students
SET city = 'Dhamtari'
WHERE id = 1;
```

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7. Delete a student record where id = 3.

```
DELETE FROM students WHERE id = 3;
```

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8. Add a new column marks to the table.

```
ALTER TABLE students ADD marks INT;
```

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9. Find the average marks of students.

```
SELECT AVG(marks) AS average_marks FROM students;
```

10. Create two tables and perform a JOIN operation.

```
CREATE TABLE departments (
  dept_id INT PRIMARY KEY,
  dept_name VARCHAR(50)
);

INSERT INTO departments VALUES (1, 'CSE'), (2, 'ECE');

-- Add dept_id column in students
ALTER TABLE students ADD dept_id INT;

UPDATE students SET dept_id = 1 WHERE id IN (1, 2);

SELECT s.name, s.city, d.dept_name
FROM students s
JOIN departments d
ON s.dept_id = d.dept_id;
```

Output:

```
+--------+-----------+-----------+
| name   | city      | dept_name |
|--------|-----------|-----------|
| Gaurav | Dhamtari  | CSE       |
| Ravi   | Raipur    | CSE       |
+--------+-----------+-----------+
```