LAB CYCLE:1

EXPERIMENT NO: 1

A.
1. CREATE DATABASE 24MCA30
2. use 24mca30;

```
mysql> use 24mca30;
Database changed
```

3.

a. CREATE TABLE Student(roll_no INT PRIMARY KEY,name VARCHAR(255),dob DATE,address TEXT,phone_no VARCHAR(15),blood_grp VARCHAR(5));

b. CREATE TABLE Course(Course_id INT PRIMARY KEY,Course_name varchar(255),course_duration INT);

4. show tables;

```
mysql> show tables;
+--------------------+
| Tables_in_24mca30 |
+--------------------+
| Course             |
| Student            |
+--------------------+
2 rows in set (0.01 sec)
```

5. DESC Student;

```
mysql> DESC Student;
+-----------+--------------+------+-----+---------+-------+
| Field     | Type         | Null | Key | Default | Extra |
+-----------+--------------+------+-----+---------+-------+
| roll_no   | int          | NO   | PRI | NULL    |       |
| name      | varchar(255) | YES  |     | NULL    |       |
| dob       | date         | YES  |     | NULL    |       |
| address   | text         | YES  |     | NULL    |       |
| phone_no  | varchar(15)  | YES  |     | NULL    |       |
| blood_grp | varchar(5)   | YES  |     | NULL    |       |
+-----------+--------------+------+-----+---------+-------+
6 rows in set (0.01 sec)
```

DESC Course;

```
mysql> DESC Course;
+-----------------+-------------+------+-----+---------+-------+
| Field           | Type        | Null | Key | Default | Extra |
+-----------------+-------------+------+-----+---------+-------+
| Course_id       | int         | NO   | PRI | NULL    |       |
| Course_name     | varchar(255)| YES  |     | NULL    |       |
| course_duration | int         | YES  |     | NULL    |       |
+-----------------+-------------+------+-----+---------+-------+
3 rows in set (0.01 sec)
```

6. ALTER TABLE Student DROP COLUMN blood_grp;

```
mysql> desc Student;
+----------+-------------+------+-----+---------+-------+
| Field    | Type        | Null | Key | Default | Extra |
+----------+-------------+------+-----+---------+-------+
| roll_no  | int         | NO   | PRI | NULL    |       |
| name     | varchar(255)| YES  |     | NULL    |       |
| dob      | date        | YES  |     | NULL    |       |
| address  | text        | YES  |     | NULL    |       |
| phone_no | varchar(15) | YES  |     | NULL    |       |
| Adar_no  | int         | YES  |     | NULL    |       |
+----------+-------------+------+-----+---------+-------+
```

7. alter table Student ADD COLUMN Adar_no int(20);

```
mysql> desc Student;
+----------+-------------+------+-----+---------+-------+
| Field    | Type        | Null | Key | Default | Extra |
+----------+-------------+------+-----+---------+-------+
| roll_no  | int         | NO   | PRI | NULL    |       |
| name     | varchar(255)| YES  |     | NULL    |       |
| dob      | date        | YES  |     | NULL    |       |
| address  | text        | YES  |     | NULL    |       |
| phone_no | varchar(15) | YES  |     | NULL    |       |
| Adar_no  | int         | YES  |     | NULL    |       |
+----------+-------------+------+-----+---------+-------+
```

8.ALTER TABLE Student MODIFY phone_no INT;

```
mysql> DESC Student;
+----------+-------------+------+-----+---------+-------+
| Field    | Type        | Null | Key | Default | Extra |
+----------+-------------+------+-----+---------+-------+
| roll_no  | int         | NO   | PRI | NULL    |       |
| name     | varchar(255)| YES  |     | NULL    |       |
| dob      | date        | YES  |     | NULL    |       |
| address  | text        | YES  |     | NULL    |       |
| phone_no | int         | YES  |     | NULL    |       |
| Adar_no  | int         | YES  |     | NULL    |       |
+----------+-------------+------+-----+---------+-------+
6 rows in set (0.00 sec)
```

9. drop table Course;

```
mysql> drop table Course;
Query OK, 0 rows affected (0.36 sec)

mysql> show tables;
+------------------+
| Tables_in_24mca30 |
+------------------+
| Student          |
+------------------+
1 row in set (0.00 sec)
```

B.

1. CREATE DATABASE 24MCA30
2. use 24mca30;
3.

a. create table Employee(emp_no varchar(25),emp_name varchar(255),dob date,address text,mobile_no int,dept_no varchar(10),salary int);

b. create table department(dept_no varchar(50), dept_name varchar(20), location varchar(50));

4. show tables;

```
mysql> show tables;
+------------------+
| Tables_in_24mca30 |
+------------------+
| Employee         |
| Student          |
| department       |
+------------------+
3 rows in set (0.00 sec)
```

5. DESC Employee;

```
mysql> DESC Employee;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| emp_no    | varchar(25) | YES  |     | NULL    |       |
| emp_name  | varchar(255)| YES  |     | NULL    |       |
| dob       | date        | YES  |     | NULL    |       |
| address   | text        | YES  |     | NULL    |       |
| mobile_no | int         | YES  |     | NULL    |       |
| dept_no   | varchar(10) | YES  |     | NULL    |       |
| salary    | int         | YES  |     | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
7 rows in set (0.01 sec)
```

DESC department;

```
mysql> DESC department;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| dept_no   | varchar(50) | YES  |     | NULL    |       |
| dept_name | varchar(20) | YES  |     | NULL    |       |
| location  | varchar(50) | YES  |     | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
3 rows in set (0.01 sec)
```

6. ALTER TABLE Employee ADD COLUMN designation varchar(50);

```
mysql> DESC Employee;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| emp_no      | varchar(25) | YES  |     | NULL    |       |
| emp_name    | varchar(255)| YES  |     | NULL    |       |
| dob         | date        | YES  |     | NULL    |       |
| address     | text        | YES  |     | NULL    |       |
| mobile_no   | int         | YES  |     | NULL    |       |
| dept_no     | varchar(10) | YES  |     | NULL    |       |
| salary      | int         | YES  |     | NULL    |       |
| designation | varchar(50) | YES  |     | NULL    |       |
+-------------+-------------+------+-----+---------+-------+
8 rows in set (0.00 sec)
```

7. alter table department drop column location;

```
mysql> DESC department;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| dept_no   | varchar(50) | YES  |     | NULL    |       |
| dept_name | varchar(20) | YES  |     | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

EXPERIMENT NO: 2

1. create table Persons(PersonID int PRIMARY KEY, Name varchar(30) NOT NULL, Aadhar int NOT NULL UNIQUE, Age int CHECK(Age>18));

2. create table Orders (OrderID int PRIMARY KEY, OrderNumber int NOT NULL, PersonID int, FOREIGN KEY(PersonID) REFERENCES Persons(PersonId));

3. desc Persons;

Field	Type	Null	Key	Default	Extra
PersonID	int	NO	PRI	NULL	
Name	varchar(30)	NO		NULL	
Aadhar	int	NO	UNI	NULL	
Age	int	YES		NULL	

4. desc Orders;

Field	Type	Null	Key	Default	Extra
OrderID	int	NO	PRI	NULL	
OrderNumber	int	NO		NULL	
PersonID	int	YES	MUL	NULL	

5. Alter table Employee modify Emp_no varchar(10) PRIMARY KEY;

Field	Type	Null	Key	Default	Extra
Emp_no	varchar(10)	NO	PRI	NULL	
Emp_name	varchar(30)	YES		NULL	
DoB	date	YES		NULL	
Address	text	YES		NULL	
Mobile_no	int	YES		NULL	
Dept_no	varchar(10)	YES		NULL	
Salary	int	YES		NULL	
Designation	varchar(30)	YES		NULL	

6. Alter table Department modify Dept_no varchar(10) PRIMARY KEY;

Field	Type	Null	Key	Default	Extra
Dept_no	varchar(10)	NO	PRI	NULL	
Dept_name	varchar(30)	YES		NULL	

7. Alter table Employee Add CONSTRAINT FK_Dept FOREIGN KEY(Dept_no) REFERENCES Department(Dept_no) ON DELETE CASCADE;

8. Alter table Orders drop PRIMARY KEY;

Field	Type	Null	Key	Default	Extra
OrderID	int	NO		NULL	
OrderNumber	int	NO		NULL	
PersonID	int	YES	MUL	NULL	

EXPERIMENT NO: 3

1. Add at least 10 rows into the table Employee and Department.

```
mysql> INSERT INTO Department (dept_no, dept_name) VALUES
    -> ('D01', 'HR'),
    -> ('D02', 'Finance'),
    -> ('D03', 'Engineering'),
    -> ('D04', 'Sales'),
    -> ('D05', 'Marketing');
Query OK, 5 rows affected (0.06 sec)
Records: 5  Duplicates: 0  Warnings: 0

mysql>
```

```
mysql> INSERT INTO Employee (emp_no, emp_name, dob, address, mobile_no, dept_no, salary, designation) VALUES
    -> ('emp1', 'Alice', '1985-06-15', '123 Elm St', 1234567890, 'D01', 6000, 'Manager'),
    -> ('emp2', 'Bob', '1990-08-10', '456 Oak St', 2345678901, 'D02', 8000, 'Developer'),
    -> ('emp3', 'Charlie', '1988-03-22', '789 Pine St', 3456789012, 'D03', 4000, 'Engineer'),
    -> ('emp4', 'David', '1992-11-30', '101 Maple St', 4567890123, 'D04', 5000, 'Salesperson'),
    -> ('emp5', 'Eva', '1995-04-18', '202 Birch St', 5678901234, 'D01', 5500, 'HR Assistant'),
    -> ('emp6', 'John', '1987-07-12', '303 Cedar St', 6789012345, 'D05', 10000, 'Marketing Manager'),
    -> ('emp7', 'Sara', '1991-05-25', '404 Oak St', 7890123456, 'D02', 7000, 'Accountant'),
    -> ('emp8', 'Tom', '1993-09-04', '505 Pine St', 8901234567, 'D03', 6000, 'Developer'),
    -> ('emp9', 'Ursula', '1989-01-09', '606 Birch St', 9012345678, 'D04', 4500, 'Sales Manager'),
    -> ('emp10', 'Victor', '1994-02-20', '707 Cedar St', 1023456789, 'D01', 9500, 'HR Manager');
Query OK, 10 rows affected (0.08 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql>
mysql>
```

2. Display all the records from the above tables.

```
mysql> SELECT * FROM Employee;
+--------+----------+------------+--------------+------------+---------+--------+-------------------+
| emp_no | emp_name | dob        | address      | mobile_no  | dept_no | salary | designation       |
+--------+----------+------------+--------------+------------+---------+--------+-------------------+
| emp1   | Alice    | 1985-06-15 | 123 Elm St   | 1234567890 | D01     |   6000 | Manager           |
| emp10  | Victor   | 1994-02-20 | 707 Cedar St | 1023456789 | D01     |   9500 | HR Manager        |
| emp2   | Bob      | 1990-08-10 | 456 Oak St   | 2345678901 | D02     |   8000 | Developer         |
| emp3   | Charlie  | 1988-03-22 | 789 Pine St  | 3456789012 | D03     |   4000 | Engineer          |
| emp4   | David    | 1992-11-30 | 101 Maple St | 4567890123 | D04     |   5000 | Salesperson       |
| emp5   | Eva      | 1995-04-18 | 202 Birch St | 5678901234 | D01     |   5500 | HR Assistant      |
| emp6   | John     | 1987-07-12 | 303 Cedar St | 6789012345 | D05     |  10000 | Marketing Manager |
| emp7   | Sara     | 1991-05-25 | 404 Oak St   | 7890123456 | D02     |   7000 | Accountant        |
| emp8   | Tom      | 1993-09-04 | 505 Pine St  | 8901234567 | D03     |   6000 | Developer         |
| emp9   | Ursula   | 1989-01-09 | 606 Birch St | 9012345678 | D04     |   4500 | Sales Manager     |
+--------+----------+------------+--------------+------------+---------+--------+-------------------+
10 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM Department;
+---------+-------------+
| dept_no | dept_name   |
+---------+-------------+
| D01     | HR          |
| D02     | Finance     |
| D03     | Engineering |
| D04     | Sales       |
| D05     | Marketing   |
+---------+-------------+
5 rows in set (0.00 sec)

mysql>
```

3. Display the emp_no and name of employees from department no ‘D02’.

```
mysql> SELECT emp_no, emp_name FROM Employee WHERE dept_no = 'D02';
+--------+----------+
| emp_no | emp_name |
+--------+----------+
| emp2   | Bob      |
| emp7   | Sara     |
+--------+----------+
2 rows in set (0.00 sec)

mysql>
```

4. Display emp_no, emp_name , designation, deptno and salary of employees in the descending order of salary.

```
mysql> SELECT emp_no, emp_name, designation, dept_no, salary
    -> FROM Employee
    -> ORDER BY salary DESC;
+--------+----------+--------------------+---------+--------+
| emp_no | emp_name | designation        | dept_no | salary |
+--------+----------+--------------------+---------+--------+
| emp6   | John     | Marketing Manager  | D05     |  10000 |
| emp10  | Victor   | HR Manager         | D01     |   9500 |
| emp2   | Bob      | Developer          | D02     |   8000 |
| emp7   | Sara     | Accountant         | D02     |   7000 |
| emp1   | Alice    | Manager            | D01     |   6000 |
| emp8   | Tom      | Developer          | D03     |   6000 |
| emp5   | Eva      | HR Assistant       | D01     |   5500 |
| emp4   | David    | Salesperson        | D04     |   5000 |
| emp9   | Ursula   | Sales Manager      | D04     |   4500 |
| emp3   | Charlie  | Engineer           | D03     |   4000 |
+--------+----------+--------------------+---------+--------+
10 rows in set (0.00 sec)

mysql>
```

5. Display the emp_no , name of employees whose salary is between 2000 and 5000

```
mysql> SELECT emp_no, emp_name FROM Employee WHERE salary BETWEEN 2000 AND 5000;
+--------+----------+
| emp_no | emp_name |
+--------+----------+
| emp3   | Charlie  |
| emp4   | David    |
| emp9   | Ursula   |
+--------+----------+
3 rows in set (0.00 sec)

mysql>
```

6. Display the designations without duplicate values

```
mysql> SELECT DISTINCT designation FROM Employee;
+--------------------+
| designation        |
+--------------------+
| Manager            |
| HR Manager         |
| Developer          |
| Engineer           |
| Salesperson        |
| HR Assistant       |
| Marketing Manager  |
| Accountant         |
| Sales Manager      |
+--------------------+
9 rows in set (0.00 sec)

mysql>
```

7. Change the salary of employees to 45000 whose designation is 'Manager'

```
mysql> UPDATE Employee SET salary = 45000 WHERE designation = 'Manager';
Query OK, 1 row affected (0.04 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> SELECT * FROM Employee WHERE designation = 'Manager';
+--------+----------+------------+------------+------------+---------+--------+-------------+
| emp_no | emp_name | dob        | address    | mobile_no  | dept_no | salary | designation |
+--------+----------+------------+------------+------------+---------+--------+-------------+
| emp1   | Alice    | 1985-06-15 | 123 Elm St | 1234567890 | D01     |  45000 | Manager     |
+--------+----------+------------+------------+------------+---------+--------+-------------+
1 row in set (0.00 sec)
```

8. Change the mobile number of employees named John

```
mysql> UPDATE Employee SET mobile_no = 9876543210 WHERE emp_name = 'John';
Query OK, 1 row affected (0.05 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> SELECT * FROM Employee WHERE emp_name = 'John';
+--------+----------+------------+-------------+------------+---------+--------+-------------------+
| emp_no | emp_name | dob        | address     | mobile_no  | dept_no | salary | designation       |
+--------+----------+------------+-------------+------------+---------+--------+-------------------+
| emp6   | John     | 1987-07-12 | 303 Cedar St | 9876543210 | D05     |  10000 | Marketing Manager |
+--------+----------+------------+-------------+------------+---------+--------+-------------------+
1 row in set (0.00 sec)
```

9. Delete all employees whose salary is equal to Rs.7000

```
mysql> DELETE FROM Employee WHERE salary = 7000;
Query OK, 1 row affected (0.04 sec)

mysql> SELECT * FROM Employee;
+--------+----------+------------+-------------+------------+---------+--------+-------------------+
| emp_no | emp_name | dob        | address     | mobile_no  | dept_no | salary | designation       |
+--------+----------+------------+-------------+------------+---------+--------+-------------------+
| emp1   | Alice    | 1985-06-15 | 123 Elm St   | 1234567890 | D01     |  45000 | Manager           |
| emp10  | Victor   | 1994-02-20 | 707 Cedar St | 1023456789 | D01     |   9500 | HR Manager        |
| emp2   | Bob      | 1990-08-10 | 456 Oak St   | 2345678901 | D02     |   8000 | Developer         |
| emp3   | Charlie  | 1988-03-22 | 789 Pine St  | 3456789012 | D03     |   4000 | Engineer          |
| emp4   | David    | 1992-11-30 | 101 Maple St | 4567890123 | D04     |   5000 | Salesperson       |
| emp5   | Eva      | 1995-04-18 | 202 Birch St | 5678901234 | D01     |   5500 | HR Assistant      |
| emp6   | John     | 1987-07-12 | 303 Cedar St | 9876543210 | D05     |  10000 | Marketing Manager |
| emp8   | Tom      | 1993-09-04 | 505 Pine St  | 8901234567 | D03     |   6000 | Developer         |
| emp9   | Ursula   | 1989-01-09 | 606 Birch St | 9012345678 | D04     |   4500 | Sales Manager     |
+--------+----------+------------+-------------+------------+---------+--------+-------------------+
9 rows in set (0.00 sec)
```

10. Retrieve the name, mobile number of all employees whose name start with “A”.

```
mysql> SELECT emp_name, mobile_no FROM Employee WHERE emp_name LIKE 'A%';
+----------+------------+
| emp_name | mobile_no  |
+----------+------------+
| Alice    | 1234567890 |
+----------+------------+
1 row in set (0.00 sec)
```

11. Display the details of the employee whose name has at least three characters and salary greater than 20000.

```
mysql> SELECT * FROM Employee WHERE LENGTH(emp_name) >= 3 AND salary > 20000;
+--------+----------+------------+------------+------------+---------+--------+-------------+
| emp_no | emp_name | dob        | address    | mobile_no  | dept_no | salary | designation |
+--------+----------+------------+------------+------------+---------+--------+-------------+
| emp1   | Alice    | 1985-06-15 | 123 Elm St | 1234567890 | D01     |  45000 | Manager     |
+--------+----------+------------+------------+------------+---------+--------+-------------+
1 row in set (0.00 sec)
```

12. Display the details of employees with empid ‘emp1’, ‘emp2’ and ‘emp6’.

```
mysql> SELECT * FROM Employee WHERE emp_no IN ('emp1', 'emp2', 'emp6');
+--------+----------+------------+-------------+------------+---------+--------+------------------+
| emp_no | emp_name | dob        | address     | mobile_no  | dept_no | salary | designation      |
+--------+----------+------------+-------------+------------+---------+--------+------------------+
| emp1   | Alice    | 1985-06-15 | 123 Elm St  | 1234567890 | D01     |  45000 | Manager          |
| emp2   | Bob      | 1990-08-10 | 456 Oak St  | 2345678901 | D02     |   8000 | Developer        |
| emp6   | John     | 1987-07-12 | 303 Cedar St| 9876543210 | D05     |  10000 | Marketing Manager|
+--------+----------+------------+-------------+------------+---------+--------+------------------+
3 rows in set (0.00 sec)
```

13. Display employee name and employee id of those who have salary between 120000 and 300000.

```
mysql> SELECT emp_no, emp_name FROM Employee WHERE salary BETWEEN 120000 AND 300000;
+--------+----------+
| emp_no | emp_name |
+--------+----------+
| emp1   | Alice    |
| emp2   | Bob      |
+--------+----------+
2 rows in set (0.00 sec)
```

14. Display the details of employees whose designation is ‘Manager’ or ‘Computer Assistant’.

```
mysql> SELECT * FROM Employee WHERE designation IN ('Manager', 'Computer Assistant');
+--------+----------+------------+------------+------------+---------+--------+-------------+
| emp_no | emp_name | dob        | address    | mobile_no  | dept_no | salary | designation |
+--------+----------+------------+------------+------------+---------+--------+-------------+
| emp1   | Alice    | 1985-06-15 | 123 Elm St | 1234567890 | D01     | 150000 | Manager     |
+--------+----------+------------+------------+------------+---------+--------+-------------+
1 row in set (0.00 sec)

mysql>
```

15. Displays how many employees work for each department.

```
mysql> SELECT dept_no, COUNT(*) AS employee_count FROM Employee GROUP BY dept_no;
+---------+----------------+
| dept_no | employee_count |
+---------+----------------+
| D01     |              3 |
| D02     |              1 |
| D03     |              2 |
| D04     |              2 |
| D05     |              1 |
+---------+----------------+
5 rows in set (0.00 sec)

mysql>
```

16. Displays average salary of employees in each department.

```
mysql> SELECT dept_no, AVG(salary) AS average_salary FROM Employee GROUP BY dept_no;
+---------+----------------+
| dept_no | average_salary |
+---------+----------------+
| D01     |     55000.0000 |
| D02     |    150000.0000 |
| D03     |      5000.0000 |
| D04     |      4750.0000 |
| D05     |     10000.0000 |
+---------+----------------+
5 rows in set (0.00 sec)
```

17. Displays total salary of employees in each department.

```
mysql> SELECT dept_no, SUM(salary) AS total_salary FROM Employee GROUP BY dept_no;
+---------+--------------+
| dept_no | total_salary |
+---------+--------------+
| D01     |       165000 |
| D02     |       150000 |
| D03     |        10000 |
| D04     |         9500 |
| D05     |        10000 |
+---------+--------------+
5 rows in set (0.00 sec)
```

18. Displays top and lower salary of employees in each department.

```
mysql> SELECT dept_no, MAX(salary) AS top_salary, MIN(salary) AS lowest_salary
    -> FROM Employee
    -> GROUP BY dept_no;
+---------+------------+---------------+
| dept_no | top_salary | lowest_salary |
+---------+------------+---------------+
| D01     |     150000 |          5500 |
| D02     |     150000 |        150000 |
| D03     |       6000 |          4000 |
| D04     |       5000 |          4500 |
| D05     |      10000 |         10000 |
+---------+------------+---------------+
5 rows in set (0.00 sec)
```

19. Displays average salary of employees in all departments except department with department number ‘D05’.

```
mysql> SELECT dept_no, AVG(salary) AS average_salary
    -> FROM Employee
    -> WHERE dept_no != 'D05'
    -> GROUP BY dept_no;
+---------+----------------+
| dept_no | average_salary |
+---------+----------------+
| D01     |     55000.0000 |
| D02     |    150000.0000 |
| D03     |      5000.0000 |
| D04     |      4750.0000 |
+---------+----------------+
4 rows in set (0.00 sec)
```

20. Displays average salary of employees in all departments except department with department number ‘D01’ and average salary greater than 20000 in the ascending order of average salary.

```
mysql> SELECT dept_no, AVG(salary) AS average_salary
    -> FROM Employee
    -> WHERE dept_no != 'D01'
    -> GROUP BY dept_no
    -> HAVING AVG(salary) > 20000
    -> ORDER BY average_salary ASC;
+---------+----------------+
| dept_no | average_salary |
+---------+----------------+
| D02     |    150000.0000 |
+---------+----------------+
1 row in set (0.00 sec)
```