Practical No. 5

Aim: Queries using
1.string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr, ELT(), Char_Length(), Format(), Find_In_Set, Oct(), Reverse(), Repeat(), Ascii())
ii.date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date, PERIOD_DIFF)
iii. numeric functions: Abs (), power (), sqrt (), greatest (), least (), round (), mod ().
iv. time functions (Localtime,Minute(datetime), Microsecond)

Theory:

1. **String Functions**:
   o String functions are used for manipulating text data.
   o Concatenation combines two or more strings.
   o Lpad and Rpad add characters to the left or right of a string.
   o Ltrim and Rtrim remove spaces from the left or right of a string.
   o Lower converts text to lowercase, while Upper converts it to uppercase.
   o Initcap capitalizes the first letter of each word.
   o Length returns the length of a string.
   o Substr extracts a portion of a string.
   o Instr finds the position of a substring in a string.
   o ELT() returns the Nth element from a comma-separated list.
   o Char_Length() returns the character length of a string.
   o Format(), Find_In_Set, Oct(), Reverse(), Repeat(), and Ascii() perform various string operations.
2. **Date Functions**:
   o Date functions are used for manipulating date and time data.
   o Sysdate retrieves the current date and time.
   o Next_day returns the next specified day of the week.
   o Add_months adds or subtracts months from a date.
   o Last_day returns the last day of the month.
   o Months_between calculates the difference in months between two dates.
   o Least returns the smallest date from a list.
   o Greatest returns the largest date from a list.
   o Trunc and Round modify the precision of a date or timestamp.
   o To_char and To_date convert between date formats.
   o PERIOD_DIFF calculates the difference between two periods.
3. **Numeric Functions**:
   o Numeric functions are used for mathematical operations.
   o Abs() returns the absolute value of a number.
   o Power() raises a number to a specified power.
   o Sqrt() calculates the square root of a number.
   o Greatest() returns the largest number from a list.
   o Least() returns the smallest number from a list.

o Round() rounds a number to a specified number of decimal places.
o Mod() calculates the remainder of a division operation.
4. **Time Functions**:
   o Time functions are used for working with time data.
   o Localtime retrieves the current local time.
   o Minute(datetime) returns the minute component of a datetime value.
   o Microsecond returns the microsecond component of a datetime value.

Queries:

1.string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower,
upper, initcap, length, substr and instr, ELT(), Char_Length(),
Format(), Find_In_Set, Oct(), Reverse(), Repeat(), Ascii())

```
mysql> /*202203103510124*/
mysql> -- Concatenation
mysql> SELECT CONCAT('Hello', ' ', 'World') AS Result;
+-------------+
| Result      |
+-------------+
| Hello World |
+-------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- LPAD
mysql> SELECT LPAD('123', 5, '0') AS Result;
+--------+
| Result |
+--------+
| 00123  |
+--------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- RPAD
mysql> SELECT RPAD('123', 5, '0') AS Result;
+--------+
| Result |
+--------+
| 12300  |
+--------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- LTRIM
mysql> SELECT LTRIM('   Hello') AS Result;
+--------+
| Result |
+--------+
| Hello  |
+--------+
1 row in set (0.00 sec)
```

```
mysql> /*202203103510124*/
mysql> -- RTRIM
mysql> SELECT RTRIM('Hello    ') AS Result;
+--------+
| Result |
+--------+
| Hello  |
+--------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- LOWER
mysql> SELECT LOWER('Hello World') AS Result;
+-------------+
| Result      |
+-------------+
| hello world |
+-------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- UPPER
mysql> SELECT UPPER('Hello World') AS Result;
+-------------+
| Result      |
+-------------+
| HELLO WORLD |
+-------------+
1 row in set (0.00 sec)
```

```
mysql> /*202203103510124*/
mysql> -- INITCAP
mysql> SELECT INITCAP('hello world') AS Result;
ERROR 1305 (42000): FUNCTION dbms_tables.INITCAP does not exist
mysql>
mysql> /*202203103510124*/
mysql> -- LENGTH
mysql> SELECT LENGTH('Hello World') AS Result;
+--------+
| Result |
+--------+
|     11 |
+--------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- SUBSTR (substring)
mysql> SELECT SUBSTR('Hello World', 7, 5) AS Result;
+--------+
| Result |
+--------+
| World  |
+--------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- INSTR (find position)
mysql> SELECT INSTR('Hello World', 'World') AS Result;
+--------+
| Result |
+--------+
|      7 |
+--------+
1 row in set (0.00 sec)
```

```
mysql> /*202203103510124*/
mysql> -- ELT (element at a specified position)
mysql> SELECT ELT(2, 'Apple', 'Banana', 'Cherry') AS Result;
+--------+
| Result |
+--------+
| Banana |
+--------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- CHAR_LENGTH (character length)
mysql> SELECT CHAR_LENGTH('Hello World') AS Result;
+--------+
| Result |
+--------+
|     11 |
+--------+
```

```
mysql> /*202203103510124*/
mysql> -- FORMAT (number formatting)
mysql> SELECT FORMAT(1234567.89, 2) AS Result;
+--------------+
| Result       |
+--------------+
| 1,234,567.89 |
+--------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- FIND_IN_SET (find value in a comma-separated list)
mysql> SELECT FIND_IN_SET('Banana', 'Apple,Banana,Cherry') AS Result;
+--------+
| Result |
+--------+
|      2 |
+--------+
1 row in set (0.00 sec)
```

```
mysql> /*202203103510124*/
mysql> -- OCT (convert to octal)
mysql> SELECT OCT(10) AS Result;
+--------+
| Result |
+--------+
| 12     |
+--------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- REVERSE (reverse a string)
mysql> SELECT REVERSE('Hello World') AS Result;
+-------------+
| Result      |
+-------------+
| dlroW olleH |
+-------------+
```

```
mysql> /*202203103510124*/
mysql> -- REPEAT (repeat a string multiple times)
mysql> SELECT REPEAT('ABC', 3) AS Result;
+-----------+
| Result    |
+-----------+
| ABCABCABC |
+-----------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- ASCII (get ASCII value of a character)
mysql> SELECT ASCII('A') AS Result;
+--------+
| Result |
+--------+
|     65 |
+--------+
1 row in set (0.00 sec)
```

ii.Date Functions (Sysdate, next_day, add_months, last_day,
months_between, least, greatest, trunc, round, to_char, to_date,
PERIOD_DIFF)

```
mysql> SELECT NOW() AS CurrentDate;
+---------------------+
| CurrentDate         |
+---------------------+
| 2023-10-03 19:34:38 |
+---------------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- NEXT_DAY (next occurrence of a specific day)
mysql> SELECT DATE_ADD('2023-09-21', INTERVAL (7 - DAYOFWEEK('2023-09-21')) % 7 + 1 DAY) AS NextSaturday;
+--------------+
| NextSaturday |
+--------------+
| 2023-09-24   |
+--------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- ADD_MONTHS (add months to a date)
mysql> SELECT DATE_ADD('2023-09-21', INTERVAL 3 MONTH) AS ThreeMonthsLater;
+------------------+
| ThreeMonthsLater |
+------------------+
| 2023-12-21       |
+------------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- LAST_DAY (last day of the month)
mysql> SELECT LAST_DAY('2023-09-21') AS LastDayOfMonth;
+----------------+
| LastDayOfMonth |
+----------------+
| 2023-09-30     |
+----------------+
1 row in set (0.00 sec)
```

```
mysql> /*202203103510124*/
mysql> -- ROUND (round date to a specific precision)
mysql> SELECT DATE_FORMAT('2023-09-21 14:30:45', '%Y-%m-%d %H:00:00') AS RoundedDate;
+---------------------+
| RoundedDate         |
+---------------------+
| 2023-09-21 14:00:00 |
+---------------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- TO_CHAR (convert date to string)
mysql> SELECT DATE_FORMAT('2023-09-21', '%M %d, %Y') AS FormattedDate;
+--------------------+
| FormattedDate      |
+--------------------+
| September 21, 2023 |
+--------------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- TO_DATE (convert string to date)
mysql> SELECT STR_TO_DATE('2023-09-21', '%Y-%m-%d') AS ConvertedDate;
+---------------+
| ConvertedDate |
+---------------+
| 2023-09-21    |
+---------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- PERIOD_DIFF (difference in periods between two dates)
mysql> SELECT PERIOD_DIFF('202301', '202201') AS PeriodDiff;
+------------+
| PeriodDiff |
+------------+
|         12 |
+------------+
1 row in set (0.00 sec)
```

```
mysql> /*202203103510124*/
mysql> -- MONTHS_BETWEEN (difference in months between two dates)
mysql> SELECT PERIOD_DIFF(EXTRACT(YEAR_MONTH FROM '202312'), EXTRACT(YEAR_MONTH FROM '202301')) AS MonthsDiff;
+------------+
| MonthsDiff |
+------------+
|       NULL |
+------------+
1 row in set, 1 warning (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- LEAST (returns the smallest date among multiple dates)
mysql> SELECT LEAST('2023-09-21', '2023-10-01', '2023-11-15') AS SmallestDate;
+--------------+
| SmallestDate |
+--------------+
| 2023-09-21   |
+--------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- GREATEST (returns the largest date among multiple dates)
mysql> SELECT GREATEST('2023-09-21', '2023-10-01', '2023-11-15') AS LargestDate;
+-------------+
| LargestDate |
+-------------+
| 2023-11-15  |
+-------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- TRUNC (truncate date to a specific precision)
mysql> SELECT DATE_FORMAT('2023-09-21 14:30:45', '%Y-%m-01') AS TruncatedDate;
+---------------+
| TruncatedDate |
+---------------+
| 2023-09-01    |
+---------------+
1 row in set (0.00 sec)
```

iii. Numeric Functions: Abs (), power (), sqrt (), greatest (), least (),

round (), mod ().

```
mysql> /*202203103510124*/
mysql> -- MOD (modulus, returns the remainder of a division)
mysql> SELECT MOD(10, 3) AS ModulusValue;
+--------------+
| ModulusValue |
+--------------+
|            1 |
+--------------+
1 row in set (0.00 sec)
```

```
mysql> /*202203103510124*/
mysql> -- ABS (absolute value)
mysql> SELECT ABS(-5) AS AbsoluteValue;
+---------------+
| AbsoluteValue |
+---------------+
|             5 |
+---------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- POWER (exponentiation)
mysql> SELECT POWER(2, 3) AS Exponentiation;
+----------------+
| Exponentiation |
+----------------+
|              8 |
+----------------+
```

```
mysql> /*202203103510124*/
mysql> -- SQRT (square root)
mysql> SELECT SQRT(25) AS SquareRoot;
+------------+
| SquareRoot |
+------------+
|          5 |
+------------+
1 row in set (0.00 sec)
```

```
mysql> /*202203103510124*/
mysql> -- GREATEST (returns the largest value among multiple values)
mysql> SELECT GREATEST(10, 20, 30) AS LargestValue;
+--------------+
| LargestValue |
+--------------+
|           30 |
+--------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- LEAST (returns the smallest value among multiple values)
mysql> SELECT LEAST(10, 20, 30) AS SmallestValue;
+---------------+
| SmallestValue |
+---------------+
|            10 |
+---------------+
1 row in set (0.00 sec)

mysql>
mysql> /*202203103510124*/
mysql> -- ROUND (rounds a number to a specified decimal place)
mysql> SELECT ROUND(3.14159, 2) AS RoundedValue;
+--------------+
| RoundedValue |
+--------------+
|         3.14 |
+--------------+
1 row in set (0.00 sec)
```

iv. Time Functions (Localtime,Minute(datetime), Microsecond)

```
mysql> /*202203103510124*/
mysql> select localtime() as time;
+---------------------+
| time                |
+---------------------+
| 2023-10-03 19:42:28 |
+---------------------+
1 row in set (0.00 sec)

mysql> select minut(now()) as minuts;
ERROR 1305 (42000): FUNCTION dbms_tables.minut does not exist
mysql> select minute(now()) as minuts;
+--------+
| minuts |
+--------+
|     43 |
+--------+
1 row in set (0.00 sec)

mysql> select microsecond(now()) as ms;
+------+
| ms   |
+------+
|    0 |
+------+
1 row in set (0.00 sec)
```

Conclusion:

In this practical exploration of SQL functions, we delved into four categories: string, date, numeric, and time functions, within the MySQL database system. String functions empowered us to manipulate text data, date functions facilitated date and time-related operations, numeric functions enabled mathematical calculations, and time functions offered tools for working with temporal data. These functions are indispensable in database management, allowing for data transformation, analysis, and presentation. Mastering these functions is essential for proficient database querying and data manipulation, enhancing the capabilities of database professionals in handling diverse types of data.