6 Querying and Operations Using SQL

Fastrack Revision

- **Aggregate Functions:** Aggregate functions are also called multiple row functions. These functions work on a set of records as a whole and return a single value for each column of the records on which the function is applied.
- **Aggregate Functions in SQL:**

Function	Description	Example with Output

MAX(column)	Returns the largest value from the specified column.	`mysql> SELECT MAX(Price) FROM INVENTORY;`
		`Output:`
		`673112.00`

MIN(column)	Returns the smallest value from the specified column.	`mysql> SELECT MIN(Price) FROM INVENTORY;`
		`Output:`
		`355205.00`

AVG(column)	Returns the average of the values in the specified column.	`mysql> SELECT AVG(Price) FROM INVENTORY;`
		`Output:`
		`576091.625000`

SUM(column)	Returns the sum of the values for the specified column.	`mysql> SELECT SUM(Price) FROM INVENTORY;`
		`Output:`
		`4608733.00`

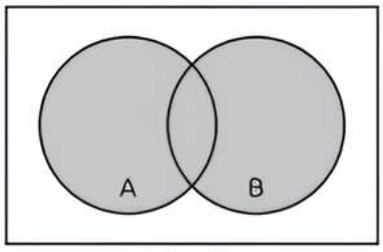
COUNT(column)	Returns the number of values in the specified column ignoring the NULL values.
	
	Note: In this example, let us consider a MANAGER table having two attributes and four records.
		`mysql> SELECT * FROM MANAGER;`
		`Output:`
		`+------+----------+`
		`| MNO | MEMNAME |`
		`+------+----------+`
		`| 1 | AMIT |`
		`| 2 | KAVREET |`
		`| 3 | KAVITA |`
		`| 4 | NULL |`
		`+------+----------+`
		`4 rows in set (0.00 sec)`
		`mysql> SELECT COUNT(MEMNAME) FROM MANAGER;`
		`Output:`
		`+-----------------+`
		`| COUNT(MEMNAME) |`
		`+-----------------+`
		`| 3 |`
		`+-----------------+`
		`1 row in set (0.01 sec)`

COUNT(*)	Returns the number of records in a table.
	
	Note: In order to display the number of records that matches a particular criteria in the table, we have to use COUNT(*) with WHERE clause.
		`mysql> SELECT COUNT(*) FROM MANAGER;`
		`Output:`
		`+----------+`
		`| count(*) |`
		`+----------+`
		`| 4 |`
		`+----------+`
		`1 row in set (0.00 sec)`

- **GROUP BY in SQL:** We need to fetch a group of rows on the basis of common values in a column. This can be done using a GROUP BY clause. It groups the rows together that contain the same values in a specified column. We can use the aggregate functions (COUNT,MAX, MIN, AVG and SUM) to work on the grouped values. HAVING clause in SQL is used to specify conditions on the rows with GROUP BY clause.
- **ORDER By in SQL:** The ORDER by clause is used to sort the result-set in ascending or descending order. It sorts the records in ascending order by default. To sort the records in descending order, we use the **DESC** keyword.
- **Operations on Relations:** We can perform certain operations on relations like Union, Intersection and Set Difference to merge the tuples of two tables. These three operations are binary operations as they work upon two tables. These operations can only be applied if both

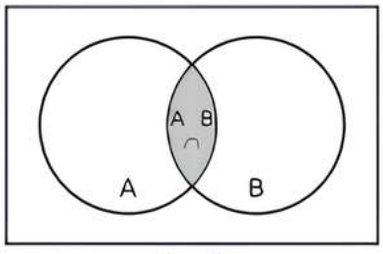
the relations have the same number of attributes and corresponding attributes in both tables have the same domain.

- **UNION (∪):** This operation is used to combine the selected rows of two tables at a time. If some rows are the same in both the tables, then the result of the UNION operation will show those rows only once.



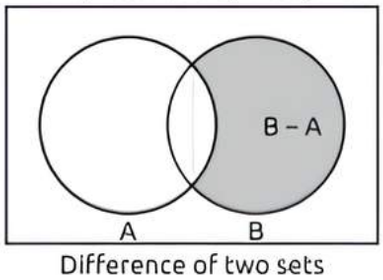
A ∪ B

- **INTERSECT (∩):** INTERSECT operation is used to get the common tuples from two tables and is represented by the symbol ∩



A ∩ B

- **MINUS (–):** This operation is used to get tuples/rows which are in the first table but not in the second table and the operation is represented by the symbol – (MINUS).



Difference of two sets
B – A

- **Cartesian Product:** Cartesian product operation combines tuples from two relations. It results in all pairs of rows from the two input relations, regardless of whether or not they have the same values on common attributes. It is denoted as 'X'. The cardinality of the resulting relation is calculated as the product of the cardinality of relations on which cartesian product is applied.
- **Cartesian Product on Two Tables:** When more than one table is to be used in a query, then we must specify the table names by separating commas in the FROM clause On execution of such a query, the DBMS(MySql) will first apply cartesian product on specified tables to have a single table.
- **JOIN on Two Tables:** JOIN operation combines tuples from two tables on specified conditions. This is unlike cartesian product, which make all possible combinations of tuples. While using the JOIN clause of SQL, we specify conditions on the related attributes of two tables within the FROM clause.
  - Following are some of the points to be considered while applying JOIN operations on two or more relations:
  - If two tables are to be joined on equality condition on the common attribute, *i.e.*, using EQUI JOIN then one may use JOIN with ON clause or NATURAL JOIN in FROM clause. If three tables are to be joined on equality condition, then two JOIN or NATURAL JOIN are required.
  - In general, N-1 joins are needed to combine N tables on equality condition.
  - With JOIN clause, we may use any relational operators to combine tuples of two tables.

Practice Exercise

Multiple Choice Questions

Q 1. Aggregate functions are also known as: *[CBSE 2023]*

a. Scalar Functions
b. Single Row Functions
c. Multiple Row Functions
d. Hybrid Functions

Q 2. By default, ORDER BY clause lists the result in ..... order.

a. descending b. any
c. same d. ascending

Q 3. Consider the following query:

```
SELECT * FROM employee ORDER BY salary
.................., name ..............;
```

To display the salary from greater to smaller and name in alphabetical order which of the following options should be used?

a. Asc, Desc
b. Desc, Asc
c. Descending, Ascending
d. Either b. or c.

Q 4. Select correct SQL query from below to find the temperature in increasing order of all cities.

a. `SELECT city FROM weather ORDER BY temperature;`
b. `SELECT city, temperature FROM weather;`
c. `SELECT city, temperature FROM weather ORDER BY temperature;`
d. `SELECT city, temperature FROM weather ORDER BY city;`

Q 5. With SQL, how can you return the number of not NULL records in the Project field of 'Students' table?

a. `SELECT COUNT(Project) FROM Students;`
b. `SELECT COLUMNS(Project) FROM Students;`
c. `SELECT COLUMNS(*) FROM Students;`
d. `SELECT COUNT(*) FROM Students;`

Q 6. Which of the following is not a valid aggregate function in MYSQL? *[CBSE 2023]*

a. COUNT ( ) b. SUM ( )
c. MAX ( ) d. LEN ( )

Q 7. Ravisha has stored the records of all students of her class in a MYSQL table. Suggest a suitable SQL clause that she should use to display the names of students in alphabetical order. *[CBSE 2023]*

a. SORT BY b. ALIGN BY
c. GROUP BY d. ORDER BY

Q 8. Raj, a Database Administrator, needs to display the average pay of workers from those departments which have more than five employees. He is experiencing a problem while running the following query:

SELECT DEPT, AVG (SAL) FROM EMP WHERE COUNT (*) > 5 GROUP BY DEPT;

Which of the following is a correct query to perform the given task? *[CBSE SQP 2023-24]*

a. SELECT DEPT, AVG (SAL) FROM EMP WHERE COUNT (*) > 5 GROUP BY DEPT;
b. SELECT DEPT, AVG (SAL) FROM EMP HAVING COUNT (*) > 5 GROUP BY DEPT;
c. SELECT DEPT, AVG (SAL) FROM EMP GROUP BY DEPT WHERE COUNT (*) > 5;
d. SELECT DEPT, AVG (SAL) FROM EMP GROUP BY DEPT HAVING COUNT (*) > 5;

Q 9. The HAVING clause does which of the following?

a. Acts EXACTLY like a WHERE clause
b. Acts like a WHERE clause but is used for columns rather than groups
c. Acts like a WHERE clause but is used for groups rather than rows
d. Acts like a WHERE clause but is used for rows rather than columns

Q 10. Aggregate functions can be used in the select list or the ..... clause of a select statement. They cannot be used in a ..... clause.

a. WHERE, HAVING b. HAVING, WHERE
c. GROUP BY, HAVING d. GROUP BY, WHERE

Q 11. SQL applies conditions on the groups through ..... clause after groups have been formed.

a. GROUP BY b. WITH
c. WHERE d. HAVING

Q 12. Which clause is used with "aggregate functions"?

a. GROUP BY b. SELECT
c. WHERE d. Both a. and c.

Q 13. What is the meaning of "HAVING" clause in SELECT query?

a. To filter out the summary groups
b. To filter out the column groups
c. To filter out the row and column values
d. None of the above

Q 14. WHERE and HAVING clauses can be used interchangeably in SELECT queries.

a. True b. False
c. Only in views d. With ORDER BY

Q 15. A ..... is a query that retrieves rows from more than one table or view.

a. START b. END
c. JOIN d. All of these

Q 16. A condition given in a JOIN query is referred to as .....

a. JOIN in SQL
b. JOIN Condition
c. JOIN in SQL and Condition
d. None of the above

Q 17. Which of the following is not a join type?

a. Empty join b. Natural join
c. Equi join d. Right join

Q 18. Which product is returned in a join query having no join condition?

a. Equi join b. Carteslan
c. Both a. and b. d. Natural

Q 19. The carteslan product is also called ..... join.

a. Equi b. Natural
c. Unrestricted d. Restricted

Q 20. In which type of join, the join condition contains an equality operator?

a. Equi join b. Natural join
c. Left join d. Right join

Q 21. In which type of join, duplicate columns are there?

a. Equi join b. Natural
c. Left join d. Right join

Q 22. In which type of join, no duplicate columns are there?

a. Equi join b. Natural join
c. Left join d. Right join

Q 23. With SELECT statement used for joins, the USING subclause produces ..... join.

a. Equi b. Natural c. Left d. Right

Q 24. With SELECT statement used for joins, the ON subclause produces ..... join.

a. Equi b. Natural c. Left d. Right

Q 25. What is the correct statement for describing the UNION operation?

a. It combines the rows of any two different queries.
b. It combines the unique rows of two different queries which have the same set of attributes in the SELECT clause.
c. It combines the rows of two different queries which have the same condition in the WHERE clause.
d. It gives the carteslan product of the results of any two queries.

Q 26. **What is the correct statement for describing the INTERSECT operation?**

a. It returns the common values from the results of any two different queries.
b. It returns the common rows of two different queries which have the same set of attributes in the SELECT clause.
c. It returns the common rows of two different queries which have the same condition in the WHERE clause.
d. None of the above.

Q 27. **What is the correct statement for describing the EXCEPT operation?**

a. It excludes all the rows present in both the queries.
b. It includes the rows of the second query but excludes the results of the first query.
c. It includes the rows of the first query but excludes the results of the second query.
d. It includes all the rows of both queries but removes duplicates.

Q 28. **What is the other name of MINUS operator?**

a. UNION b. UNION ALL
c. EXCEPT d. INTERSECT

Fill in the Blanks Type Questions

Q 29. To sort the rows of the result table, the ..... clause is specified.

Q 30. Columns can be sorted in descending sequence by using the SQL keyword .....

Q 31. The SQL built-in function ..... totals values in numeric columns.

Q 32. The SQL built-in function ..... computes the average of values in numeric columns.

Q 33. The SQL built-in function ..... obtains the largest value in a numeric column.

Q 34. The SQL built-in function ..... obtains the smallest value in a numeric column.

Q 35. The SQL built-in function ..... computes the number of rows in a table.

Q 36. The SELECT clause ..... is used to collect those rows that have the same value in a specified column.

Assertion & Reason Type Questions

Directions (Q. Nos. 37-40): *In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.*

a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
b. Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
c. Assertion (A) is true, but Reason (R) is false.
d. Assertion (A) is false, but Reason (R) is true.

Q 37. Assertion (A): JOIN operation combines tuples from two tables on specified conditions. This is unlike cartesian product, which make all possible combinations of tuples.
Reason (R): While using the JOIN clause of SQL, we specify conditions on the related attributes of two tables within the FROM clause.

Q 38. Assertion (A): Cartesian product operation combines tuples from two relations. It results in all pairs of rows from the two input relations, regardless of whether or not they have the same values on common attributes. It is denoted as 'X'.
Reason (R): UNION operation is used to get the common tuples from two tables and is represented by the symbol U.

Q 39. Assertion (A): The cardinality of the resulting relation is calculated as the sum of the cardinality of relations on which cartesian product is applied.
Reason (R): With JOIN clause, we may use any relational operators to combine tuples of two tables.

Q 40. Assertion (A): Aggregate functions are also called multiple row functions. These functions work on a set of records as a whole and return a single value for each column of the records on which the function is applied.
Reason (R): If two tables are to be joined on equality condition on the common attribute, then one may use JOIN with ON clause or NATURAL JOIN in FROM clause.

Answers

1. (c)	2. (d)	3. (d)	4. (d)	5. (a)
6. (d)	7. (d)	8. (d)	9. (c)	10. (b)
11. (d)	12. (a)	13. (a)	14. (b)	15. (c)
16. (b)	17. (a)	18. (b)	19. (c)	20. (a)
21. (a)	22. (b)	23. (b)	24. (a)	25. (b)
26. (b)	27. (c)	28. (c)		
29. ORDER BY		30. DESC		
31. SUM		32. AVG		
33. MAX		34. MIN		
35. COUNT		36. GROUP BY		
37. (a)	38. (c)	39. (d)	40. (b)	

Case Study Based Questions

Case Study 1

Following questions are based on these tables:

Table: BOOK_INFORMATION

Column Name
BOOK_ID
BOOK_TITLE
PRICE

Table: SALES

Column Name
STORE_ID
SALES_DATE
SALES_AMOUNT

Table: EXAM_RESULTS

STU_ID	FNAME	LNAME	EXAM_ID	EXAM_SCORE
10	LAURA	LYNCH	1	90
10	LAURA	LYNCH	2	85
11	GRACE	BROWN	1	78
11	GRACE	BROWN	2	72
12	JAY	JACKSON	1	95
12	JAY	JACKSON	2	92
13	WILLIAM	BISHOP	1	70
13	WILLIAM	BISHOP	2	100
14	CHARLES	PRADA	2	85

Q 1. Which SQL statement allows you to find the highest price from the table BOOK_INFORMATION?

a. `SELECT BOOK_ID, BOOK_TITLE, MAX (PRICE) FROM BOOK_INFORMATION;`
b. `SELECT MAX(PRICE) FROM BOOK_INFORMATION;`
c. `SELECT MAX (PRICE) FROM BOOK_INFORMATION;`
d. `SELECT PRICE FROM BOOK_INFORMATION ORDER BY PRICE DESC;`

Q 2. Which SQL statement lets you find the SALES AMOUNT for each store?

a. `SELECT STORE_ID, SUM(SALES_AMOUNT) FROM SALES;`
b. `SELECT STORE_ID, SUM(SALES_AMOUNT) FROM SALES ORDER BY STORE_ID;`
c. `SELECT STORE_ID, SUM(SALES_AMOUNT) FROM SALES GROUP BY STORE_ID;`
d. `SELECT STORE_ID, SUM(SALES_AMOUNT) FROM SALES HAVING UNIQUE STORE_ID;`

Q 3. Which SQL statement lets you list all stores whose total SALES AMOUNT is over 5000?

a. `SELECT STORE_ID, SUM SALES_AMOUNT) FROM SALES GROUP BY STORE_ID HAVING SUM (SALES_AMOUNT) > 5000;`
b. `SELECT STORE_ID, SUM(SALES_AMOUNT) FROM SALES GROUP BY STORE_ID HAVING SALES_AMOUNT > 5000;`
c. `SELECT STORE_ID, SUM(SALES_AMOUNT) FROM SALES WHERE SUM (SALES_AMOUNT) > 5000 GROUP BY STORE_ID;`
d. `SELECT STORE_ID, SUM(SALES_AMOUNT) FROM SALES WHERE SALES_AMOUNT > 5000 GROUP BY STORE_ID;`

Q 4. Which SQL statement lets you find the total number of stores in the SALES table?

a. `SELECT COUNT(STORE_ID) FROM SALES;`
b. `SELECT COUNT(DISTINCT STORE_ID) FROM SALES;`
c. `SELECT DISTINCT STORE_ID FROM SALES;`
d. `SELECT COUNT(STORE_ID) FROM SALES GROUP BY STORE_ID;`

Q 5. Which SQL statement allows you to find the total SALES AMOUNT for STORE ID 25 and the total SALES AMOUNT for STORE ID 45?

a. `SELECT STORE_ID, SUM(SALES_AMOUNT) FROM SALES WHERE STORE_ID IN (25, 45) GROUP BY STORE_ID;`
b. `SELECT STORE_ID, SUM(SALES_AMOUNT) FROM SALES GROUP BY STORE_ID HAVING STORE_ID IN (25, 45);`
c. `SELECT STORE_ID, SUM(SALES_AMOUNT) FROM SALES WHERE STORE_ID IN (25, 45);`
d. `SELECT STORE_ID, SUM(SALES_AMOUNT) FROM SALES WHERE STORE_ID = 25 AND STORE_ID = 45 GROUP BY STORE_ID;`

Answers

1. (a) 2. (c) 3. (a) 4. (d) 5. (b)

Case Study 2

A Fashion Store MyStore is considering to maintain database of their customers in SQL to store the data, As a Database Administrator Hina has decided that
Name of the database: MyStore
Name of the table: Customer
Attributes of the tables: Acc_No-Numeric, Cust_Name-Character 25, Cust_City - Character 25, Cust_Phone-Character 11, Open_Bal-Numeric

Table: Customer

Acc_No	Cust_Name	Cust_City	Cust_Phone	Open_Bal
1001	Dhashmesh	Ambala	9710557614	10000
1002	Sanya	Patna	8223545233	15000
1003	Joe	New Delhi	9972136576	13000
1004	Mrinal	New Delhi	9321305453	12000
1005	Ishaan	Agra	9809876798	19000

Q 1. With reference to the above given table, give query for generating following output:

Cust_Name
Dhashmesh
Sanya
Ishaan

a. `SELECT Name FROM Customer WHERE Open_bal < 20000;`
b. `SELECT Name FROM Customer WHERE Cust_City like '%a';`
c. `SELECT Cust_Name FROM Customer WHERE Cust_City like '%a';`
d. `SELECT Cust_Name FROM Customer WHERE Cust_Name like 'a%';`

Q 2. Give the output of:

```
SELECT Cust_Name, Open_Bal FROM
Customer ORDER BY Open_bal;
```

a.

Cust_Name	Open_Bal
Dhashmesh	10000
Mrinal	12000
Joe	13000
Sanya	15000
Ishaan	19000

b.

Cust_Name	Open_Bal
Ishaan	19000
Sanya	15000
Joe	13000
Mrinal	12000
Dhashmesh	10000

c.

Cust_Name	Open_Bal
Dhashmesh	10000
Ishaan	19000
Joe	13000
Mrinal	12000
Sanya	15000

d.

Cust_Name	Open_Bal
Dhashmesh	10000
Sanya	15000
Joe	13000
Mrinal	12000
Ishaan	19000

Q 3. Pranay has given the following command to obtain Highest Opening Balance of each City

```
Select MAX (Open_Bal) from Customer where
GROUP BY Cust_City;
```

but he is not getting the desired result. Help him by writing the correct command.

a. `SELECT MAX(Open_Bal) GROUP BY Cust_City;`
b. `SELECT MAX(Open_Bal) FROM Customer where GROUP BY Cust_City;`
c. `SELECT Cust_City, MAX(Open_Bal) FROM Customer GROUP BY Cust_City;`
d. `SELECT MAX(Open_Bal) FROM Customer GROUP BY Cust_Name;`

Q 4. Help Pranay find the total number of records HAVING open_bal between 15000 to 20000 by selecting the right command.

a. `SELECT total FROM customer HAVING open_bal between 15000 and 20000;`
b. `SELECT COUNT(*) FROM customer WHERE open_bal BETWEEN 15000 to 20000;`
c. `SELECT COUNT(*) FROM customer WHERE open_bal between 15000 and 20000;`
d. `SELECT COUNT(*) FROM customer ORDER BY open_bal;`

Q 5. Choose the correct command to display the first two letters of each customer's name.

a. `SELECT right(cust_name, 2) FROM customer;`
b. `SELECT left(cust_name, 2) FROM customer;`
c. `SELECT right(cust_name, 0, 2) FROM customer;`
d. `SELECT left(cust_name, 2) FROM customer;`

Answers

1. (c) 2. (a) 3. (c) 4. (c) 5. (b)

Case Study 3

Consider the below two tables for reference and answer the following questions:

Table–EmployeeDetails

EmpId	FullName	ManagerId	Date of Joining	City
121	John Snow	321	31/01/2014	Toronto
321	Walter White	986	30/01/2015	California
21	Kuldeep Rana	876	27/11/2016	New Delhi

Table–EmployeeSalary

EmpId	Project	Salary	Variable
121	P1	8000	500
321	P2	10000	1000
421	P1	12000	0

Q 1. Write an SQL query to fetch the EmpId and FullName of all the employees working under Manager with Id – '986'.

Q 2. Write an SQL query to fetch the different projects available from the EmployeeSalary table.

Q 3. Write an SQL query to fetch the count of employees working in project 'P1'.

Q 4. Write an SQL query to find the maximum, minimum and average salary of the employees.

Q 5. Write an SQL query to find the employee id whose salary lies in the range of 9000 and 15000.

Answers

1. `SELECT EmpId, FullName FROM EmployeeDetails WHERE ManagerId=986;`
2. `SELECT DISTINCT(Project) FROM EmployeeSalary;`
3. `SELECT COUNT(*) FROM EmployeeSalary WHERE Project = 'P1';`
4.
```
SELECT MAX(Salary)
MIN(Salary),
AVG(Salary)
FROM Employee Salary;
```
5.
```
SELECT EmpId, Salary
FROM Employee Salary
WHERE Salary BETWEEN 9000 and 15000;
```

Case Study 4

Consider the below two tables for reference and answer the following questions:

Table–EmployeeDetails

EmpId	FullName	ManagerId	Date of Joining	City
121	John Snow	321	31/01/2014	Toronto
321	Walter White	986	30/01/2015	California
421	Kuldeep Rana	876	27/11/2016	New Delhi

Table – EmployeeSalary

EmpId	Project	Salary	Variable
121	P1	8000	500
321	P2	10000	1000
421	P1	12000	0

Q 1. Write an SQL query to fetch those employees who live in Toronto and work under manager with ManagerId – 321.

Q 2. Write an SQL query to fetch all the employees who either live in California or work under a manager with ManagerId – 986.

Q 3. Write an SQL query to fetch all those employees who work on Project other than P1.

Q 4. Write an SQL query to display the total salary of each employee adding the Salary with Variable value.

Q 5. Write an SQL query to fetch the employees whose name begins with any two characters, followed by a text "hn" and ending with any sequence of characters.

Answers

1. `SELECT EmpId, City, ManagerId FROM EmployeeDetails WHERE City='Toronto' AND ManagerId='321';`
2. `SELECT EmpId, City, ManagerId FROM EmployeeDetails WHERE City='California' OR ManagerId='986';`
3. `SELECT EmpId FROM EmployeeSalary WHERE NOT Project = 'P1';`
4. `SELECT EmpId, Salary+Variable as TotalSalary FROM EmployeeSalary;`
5. `SELECT FullName FROM EmployeeDetails WHERE FullName LIKE '_ _ hn%';`

Very Short Answer Type Questions

Q 1. What is the use of ORDER BY clause?

Ans. ORDER BY clause used to arrange the result set of query in ascending or descending order in order of single or multiple columns. ORDER BY clause is used in conjunction with SELECT statement.

Q 2. What is the default sort order of ORDER BY clause?

Ans. The ORDER BY sorts the records in ascending order by default.

Q 3. What is the use of GROUP BY clause?

Ans. The GROUP BY clause combines all those records that have identical value in a particular field or a group of fields.

Q 4. In SQL, name the clause that is used to display the tuples in ascending order of an attribute. *[CBSE SQP 2020]*

Ans. ORDER BY

Q 5. Which clause is used with a SELECT command in SQL to display the records in ascending order of an attribute?

Ans. ORDER BY

Q 6. The SQL SELECT provides clauses for sorting data and for summarising results. Write the names of clauses for these.

Ans. The ORDER BY clause of SQL SELECT statement allows to sort the data of result set. The GROUP BY clause of SQL SELECT statement allows to create summarised results of grouped data from table.

Q 7. What is the significance of GROUP BY clause in a SQL query?

Ans. The GROUP BY clause combines all those records that have identical values in a particular field or a group of fields. This grouping results into one summary record per group if group-functions are used with it.

Q 8. What is the difference between a WHERE clause and a HAVING clause of SQL SELECT statement?

Ans. The difference between WHERE and HAVING clause is that WHERE conditions are applicable on individual rows whereas HAVING conditions are applicable on groups as formed by GROUP BY clause.

Q 9. Write a query to display the Sum, Average, Highest and Lowest salary of the employees.

Ans.
```
mysql > SELECT SUM (sal), AVG (sal),
MAX (sal), MIN (sal)
        FROM empl;
```

Q 10. Write a query to display the Sum, Average, Highest and Lowest salary of the employees grouped by department number.

Ans.
```
mysql > SELECT SUM (sal), AVG (sal),
MAX (sal), MIN (sal)
        FROM empl GROUP BY deptno;
```

Q 11. Which SQL aggregate function is used to COUNT ALL records of a table? *[CBSE 2020]*

Ans. COUNT(*)

Q 12. Write a query to display the number of employees with same job.

Ans.
```
mysql>SELECT COUNT (*) "No_of_Empe", job
    FROM empl GROUP BY job;
```

Q 13. Write a query that counts the number of salespeople registering orders for each day. (If a salesperson has more than one order on a given day, he or she should be counted only once).

Ans.
```
SELECT ord_date, count (DISTINCT
salesman_code) FROM orders
GROUP BY ord_data;
```

Q 14. Define an equi join. What is non-equi join?

Ans. Equi Join: Join in which tables are compared for equality.

Non-equi Join: Join in which tables are compared for non-equality.

Q 15. What is join?

Ans. A SQL join is an query used within the SQL (Structured Query Language) to combine data from two table on the basis of a common field.

Q 16. How many different types of joins can you create in MySQL?

Ans. We can create following joins in MySQL:

(i) Cross join
(ii) Natural join
(iii) Equi join
(iv) Inner join
(v) Left join
(vi) Right join

Q 17. There are multiple ways to create cartesian product of two tables in MySQL. Describe them.

Ans. There are following ways to create cartesian product:

(i) `SELECT * FROM <Table 1> CROSS JOIN <Table 2>;`

(ii) `SELECT * FROM <Table 1 > , <Table 2> ;`

Q 18. Can you join two tables without using the keyword JOIN?

Ans. Yes.

For example: `SELECT * FROM school, student;`

Q 19. A table STUDENT has 4 rows and 2 columns and another table TEACHER has 3 rows and 4 columns. How many rows and columns will be there if we obtain the cartesian product of these two tables?

Ans. Rows = 12, Columns = 6

Q 20. What does UNION do?

Ans. UNION will remove the duplicate rows from the final output.

Q 21. Are UNION and UNION ALL the same? Why?

Ans. No, UNION ALL will retain all the duplicate rows from tables in the final output while UNION will remove the duplicate rows from the final output.

Short Answer Type-I Questions

Q 1. What are aggregate functions in SQL? Name any two. *[CBSE SQP 2023-24]*

Ans. Aggregate functions: These are also called multiple row functions. These functions work on a set of records as a whole, and return a single value for each column of the records on which the function is applied.

Max(), Min(), Avg(), Sum(), Count() and Count(*) are few examples of multiple row functions.

Q 2. Differentiate between COUNT () and Count (*) functions in MYSQL. Give suitable examples to support your answer. *[CBSE 2023]*

Ans. Count( ): This function returns the number of values in the specified column ignoring the NULL values.

For example, let us consider a MANAGER table having two attributes and four records as shown:

MNo	MEMNAME
1	AMIT
2	KAVREET
3	KAVITA
4	NULL

Query: SELECT COUNT (MEMNAME) FROM MANAGER;

Output:

COUNT (MEMNAME)
3

Count (*): This function returns the number of records in a table.

Query: SELECT COUNT (*) FROM MANAGER;

Output:

Count (*)
4

Q 3. What is the difference between the ORDER BY and GROUP BY clause when used alongwith the SELECT statement? Explain with an example. *[CBSE SQP 2020-21]*

Ans. The ORDER BY clause is used to show the output of the SELECT query in a sorted manner as per the field name given in the ORDER BY clause. The result can be arranged in the ascending or descending order of the mentioned field.

The GROUP BY clause of a SELECT query is used to group rows in a given field and then perform the mentioned action such as apply an aggregate function for example, MAX( ), MIN( ), etc., on the entire group or display a group as per a specific condition (through HAVING clause.).

Q 4. What is the difference between WHERE and HAVING Clause?

Ans. Difference between WHERE and HAVING Clause

S.No.	WHERE Clause	HAVING Clause
1.	It is implemented in row operations.	It is implemented in column operations.
2.	It is applied to single row.	It is applied to summarised rows or groups.
3.	Aggregate functions can not be used.	Can use aggregate functions.
4.	Can be used with SELECT, UPDATE, DELETE statements.	Can only be used with SELECT statements.

TiP

Write the difference in tabular form on separate bases and include examples also for both the Clauses.

Q 5. You want to group the result set based on some column's value. Also, you want that the grouped result should appear in a sorted order. In which order will you write the two clauses (for sorting and for grouping). Give example to support your answer.

Ans. When we use GROUP BY clause (for grouping of data) and ORDER BY clause (for sorting data) together, the ORDER BY clause always follows other clauses. That is, the GROUP BY clause will come before ORDER BY clause. **For example,**

```
SELECT userId, SUM (score) AS total_score
        FROM user_score
        GROUP BY userid
        ORDER BY userid ASC;
```

Q 6. Write a query to display the difference of highest and lowest salary of each department having maximum salary > 4000.

Ans.
```
mysql>SELECT MAX(sal)-MIN(sal) "Difference"
FROM empl
        GROUP BY DeptNo
        HAVING MAX (sal) > 4000;
```

Q 7. Write a query to display the Sum, Average, Highest and Lowest salary of the employees grouped by department number and sub-grouped by job.

Ans.
```
mysql>SELECT SUM (sal), AVG (sal),
MAX (sal), MIN (sal)
        FROM empl
        GROUP BY DeptNo, job;
```

Q 8. Gopi Krishna is using a table Employee. It has the following columns:

Code, Name, Salary, Deptcode

He wants to display maximum salary department wise. He wrote the following command:

SELECT Deptcode, Max (Salary) FROM Employee;

But he did not get the desired result.

Rewrite the above query with necessary changes to help him get the desired output.

Ans.
```
SELECT DeptCode,MAX(Salary)
FROM Employee
GROUP BY DeptCode;
```

Q 9. Shanya Khanna is using a table Employee. It has the following columns:

Admno, Name, Agg, Stream

[column Agg contains Aggregate marks]

She wants to display highest Agg obtained in each Stream.

She wrote the following statement:

SELECT Stream, MAX (Agg) FROM Employee;

But she did not get the desired result.

Rewrite the above query with necessary changes to help her get the desired output.

Ans.
```
SELECT Stream, MAX (Agg)
FROM Employee
GROUP BY Stream;
```

Q 10. Write a query on the customers table that will find the highest rating in each city. Put the output in this form: For the city (city), the highest rating is: (rating).

Ans.
```
SELECT 'For the city', city, 'the highest
rating is :', MAX (rating)
FROM customers
GROUP BY city;
```

Q 11. What is a join? How is natural join different from an equi join?

Ans. Join: A join is a query that combines rows from two or more tables based on a condition.

Natural Join: Join that consists of only one of the identical columns, coming from joined tables.

Equi Join: Join in which tables are compared for equality.

Q 12. What is a table alias? What is the purpose of table alias?

Ans. Table Alias: A Table Alias is a temporary label given along with table name in FROM clause.

The purpose of table alias is To cut down on the amount of typing required in our queries we can use aliases for table names in the SELECT and WHERE clauses.

For Example: If we wanted to use the abbreviation 'T' for the 'table' in your query all we need to is tell MySQL that 'table' will be referenced by 'T' in the FROM clause.

Q 13. How is a left join different from a natural join? Give example.

Ans. Left Join: A form of join where all the rows (even non-matching ones) from the first table are returned in the result.

Example:
```
Select * from Student LEFT Join
School on Student.roll = School.
roll;
```

Natural Join: A join where identical column from both tables is shown just one in the result.

Example:
```
Select * from Student Natural Join
School;
```

Q 14. How is a cross join different from natural join? Give example.

Ans. Cross Join: A form of join that produces all possible combinations of row from two tables.

Example:
```
Select * from School CROSS JOIN
Student;
```

Natural Join: A join where identical column from both tables is shown just one in the result.

Example:
```
Select * from Student Natural Join
School;
```

Q 15. What is the difference between ON and USING JOIN-clauses?

Ans. Difference between ON and USING sub-clauses of JOIN clause of SELECT is that ON clause requires a complete join-condition whereas USING clause requires just the name of a join field.

Knowledge BOOSTER

USING sub clauses produces natural join whereas ON clause produces equi join.

Q 16. Define the following: (i) Cross join (ii) Left join.

Ans. (i) Cross Join: A form of join that produces all possible combinations of row from two tables.

(ii) Left Join: A form of join where all the rows (even non-matching ones) from the first table are returned in the result.

Q 17. Define the following:
(i) Natural join (ii) Equi join

Ans. (i) Natural Join: A join where identical column from both tables is shown just one in the result.

(ii) Equi join: A join based on equality of a common field of two tables and in which the identical column is shown twice.

Q 18. What will be the join of following two relations?

R1 (A, B, C):

A	B	C
I	1	Y
J	3	Y
K	3	Z
L	2	Y
M	1	Z
N	7	Y

R2 (B, D, E):

B	D	E
1	p	S
2	q	T
5	p	U
7	q	T

Ans.

Equi join

A	B	C	B	D	E
I	1	Y	1	p	S
L	2	Y	2	q	T
M	1	Z	1	p	S
N	7	Y	7	q	T

Natural Join

A	B	C	D	E
I	1	Y	p	S
L	2	Y	q	T
M	1	Z	p	S
N	7	Y	q	T

Q 19. Given two tables:

```
Employee          Pay Table
employee_id       employee_id
last_name         salary
first_name        department
middle_name       supervisor
marital_status
```

Find out the salary taken by all SMITH *i.e.*, all those who have their last name as SMITH.

Ans.
```
SELECT e.employee_id, e.last_name, ep.salary
FROM employee_table, employee_pay_tbl ep
WHERE e.employee_id = ep.employee_id
AND e.last_name = 'SMITH';
```

Q 20. Write query to produce all the details only for female pets records of pet and event tables (joined).

Ans.
```
SELECT*
FROM pet
JOIN event
USING (name)
WHERE sex = 'f';
```

Q 21. In a Database there are two tables:

Table: ITEM

Item_ Code	Item_Name	Price
111	Refrigerator	90,000
222	Television	75,000
333	Computer	42,000
444	Washing Machine	27,000

Table: BRAND

Item_ Code	Brand_ Name
111	LG
222	Sony
333	HCL
444	IFB

Write MySQL queries for the following:

(i) To display Item_Code, Item_Name and corresponding Brand_Name of those Items, whose Price is between 20000 and 40000 (both values inclusive).

(ii) To display Item_Code, Price and Brand_Name of the item, which has Item_Name as "Computer".

Ans. (i)
```
SELECT I.Item_Code, Item_Name, Brand_Name
FROM Item I, Brand B
WHERE I. Item_Code = B. Item_Code
AND Price BETWEEN 20000 AND 40000;
```

(ii)
```
SELECT I.Item_Code, Price, BrandName
FROM Item I, Brand B
WHERE I.Item_Code = B.Item_Code
AND Item_Name = "Computer";
```

Q 22. In a Database School there are two tables Member and Division as shown below:

Table: Member

EmpId	Name	Pay	Divno
1001	Shankhya	34000	10
1003	Ridhima	32000	50
1002	Sunish	45000	20

Table: Division

Divno	Divname	Location
10	Media	TF02
20	Dance	FF02
30	Production	SF01

(i) Identify the foreign key in the table Member.

(ii) What output, you will get, when an equi join query is executed to get the NAME from Member Table and corresponding from Division table?

Ans. (i) Divno

(ii)

Name	Divname
Shankhya	Media
Sunish	Dance

Short Answer Type-II Questions

Q 1. What are aggregate functions? What are their use? Give some examples.

Ans. Aggregate functions work with multiple rows of table at a time and return single aggregate value.

It is basically used to produce summarised data from our database.

Basically, there are five aggregate functions: COUNT (), AVG (), MIN (), MAX () and SUM ().

Examples

```
SELECT SUM (Total) FROM ITEM;
SELECT AVG (Marks) FROM STUDENT;
SELECT DeptNo, MAX (Salary)
FROM Employee
GROUP BY DeptNo;
```

Q 2. Answer the following questions:

Following questions are based on these tables:

Table: BOOK_INFORMATION

Column Name
BOOK_ID
BOOK_TITLE
PRICE

Table: SALES

Column Name
STORE_ID
SALES_DATE
SALES_AMOUNT

Table: EXAM_RESULTS

STU_ID	FNAME	LNAME	EXAM_ID	EXAM_SCORE
10	LAURA	LYNCH	1	90
10	LAURA	LYNCH	2	85
11	GRACE	BROWN	1	78
11	GRACE	BROWN	2	72
12	JAY	JACKSON	1	95
12	JAY	JACKSON	2	92
13	WILLIAM	BISHOP	1	70
13	WILLIAM	BISHOP	2	100
14	CHARLES	PRADA	2	85

(i) What SQL statement do we use to find the average exam score for EXAM_ID = 1?

(ii) Which SQL statement do we use to find out how many students took each exam?

(iii) What SQL statement do we use to print out the record of all students whose last name starts with 'L'?

Ans. (i)
```
SELECT AVG(EXAM_SCORE) FROM EXAM_RESULTS GROUP BY EXAM_ID HAVING EXAM_ID = 1;
```

(ii)
```
SELECT EXAM_ID, COUNT(DISTINCT STU_ID) FROM EXAM_RESULTS GROUP BY EXAM_ID;
```

(iii)
```
SELECT * FROM EXAM_RESULTS WHERE LNAME LIKE 'L%';
```

Q 3. A relation vehicles is given below:

V_no	Type	Company	Price	Qty
AW125	Wagon	Maruti	250000	25
J0083	Jeep	Mahindra	4000000	15
S9090	SUV	Mitsubishi	2500000	18
M0892	Mini van	Datsun	1500000	26
W9760	SUV	Maruti	2500000	18
R2409	Mini van	Mahindra	350000	15

Write SQL commands to:

(i) Display the average price of each type of vehicle having quantity more than 20.

(ii) Count the type of vehicles manufactured by each company.

(iii) Display the total price of all the types of vehicles. *[CBSE SQP 2020-21]*

Ans. (i)
```
SELECT Type, avg (Price) FROM Vehicle GROUP BY Type HAVING Qty > 20;
```

(ii)
```
SELECT Company, COUNT (distinct Type) FROM Vehicle GROUP BY Company;
```

(iii)
```
SELECT Type, SUM (Price * Qty) FROM Vehicle GROUP BY Type;
```

Q 4. Write the output of the SQL queries (i) to (iii) based on the relations Teacher and Posting given below:

Table: Teacher

T_ID	Name	Age	Department	Date_of_Join	Salary	Gender
1	Jugal	34	Computer Sc	10/01/2017	12000	M
2	Sharmila	31	History	24/03/2008	20000	F
3	Sandeep	32	Mathematics	12/12/2016	30000	M
4	Sangeeta	35	History	01/07/2015	40000	F
5	Rakesh	42	Mathematics	05/09/2007	25000	M
6	Shyam	50	History	27/06/2008	30000	M
7	Shiv Om	44	Computer Sc	25/02/2017	21000	M
8	Shalakha	33	Mathematics	31/07/2018	20000	F

Table: POSTING

P_ID	Department	Place
1	History	Agra
2	Mathematics	Raipur
3	Computer Science	Delhi

(i) `SELECT Department, COUNT (*), FROM Teacher GROUP BY Department;`

(ii) `SELECT MAX(Date_of_Join), MIN(Date_of_Join) FROM Teacher;`

(iii)
```
SELECT Teacher.name, Teacher.Department,
Posting.Place FROM Teacher,
Posting WHERE Teacher.Department =
Posting.Department AND
Posting.Place = "Delhi''.
```

[CBSE SQP 2020-21]

Ans. (i)

Department	COUNT (*)
History	3
Computer Science	2
Mathematics	3

(ii) MAX-31/07/2018 or 2018/07/31
MIN-05/09/2007 or 2007/09/05

(iii)

Name	Department	Place
Jugal	Computer Sc	Delhi

Q 5. Write the output (i-iii) for the following SQL commands.

Table : FASHION

ID	Product	Price	Qty
F01	Kajal	970	10
F02	Foundation	2100	15
F03	Night Cream	1700	20
F04	Day Cream	1400	10
F05	Shampoo	1200	25
F06	Lipstick	850	32

(i) SELECT COUNT (Product) FROM FASHION;

(ii) SELECT SUM (Price*Qty) FROM FASHION WHERE Products "Night Cream";

(iii) SELECT LEFT (Product, 4) FROM FASHION WHERE Price > 1500; *[CBSE 2023]*

Ans. (i)

COUNT (Product)
6

(ii)

SUM (Price * Qty)
34000

(iii)

LEFT (Product, 4)
Foun
Nigh

Q 6. Find the output of the following SQL queries:

(i) SELECT SUBSTR ("CLIMATE CHANGE", 4, 4);

(ii) SELECT UCASE(RIGHT ("Pollution", 3));

(iii) SELECT LENGTH ("HAPPY") + 3; *[CBSE 2023]*

Ans. (i)

SUBSTR ("CLIMATE CHANGE", 4, 4)
MATE

(ii)

UCASE (RIGHT ("Pollution", 3))
ION

(iii)

LENGTH ("HAPPY") + 3
8

Q 7. Consider the following table GAMES. Write SQL commands for the following statements:

Table: GAMES

GCode	GameName	Type	Number	Prize Money	Schedule Date
101	Carrom Board	Indoor	2	5000	23-Jan-2004
102	Badminton	Outdoor	2	12000	12-Dec-2003
103	Table Tennis	Indoor	4	8000	14-Feb-2004
105	Chess	Indoor	2	9000	01-Jan-2004
108	Lawn Tennis	Outdoor	4	25000	19-Mar-2004

(i) To display the name of all GAMES with their GCodes.

(ii) To display details of those GAMES which are having PrizeMoney more than 7000.

(iii) To display the content of the GAMES table in ascending order of ScheduleDate.

Ans. (i) `SELECT GameName, GCode FROM GAMES;`

(ii)
```
SELECT * FROM GAMES
WHERE PrizeMoney > 7000;
```

(iii)
```
SELECT * FROM GAMES
ORDER BY ScheduleDate;
```

Q 8. Consider the following tables CABHUB and CUSTOMER. Write SQL commands for the following statements.

Table: CABHUB

Vcode	VehicleName	Make	Colour	Capacity	Charges
100	Innova	Toyota	WHITE	7	15
102	SX4	Suzuki	BLUE	4	14
104	C Class	Mercedes	RED	4	35
105	A-Star	Suzuki	WHITE	3	14
108	Indigo	Tata	SILVER	3	12

Table: CUSTOMER

CCode	CName	VCode
1	Hemant Sahu	101
2	Raj Lal	108
3	Feroza Shah	105
4	Ketan Dhal	104

(i) To display the names of all the white colored vehicles.

(ii) To display name of vehicle, make and capacity of vehicles in ascending order of their seating capacity.

(iii) To display the highest charges at which a vehicle can be hired from CABHUB.

Ans. (i)
```
SELECT VehicleName
FROM CABHUB
WHERE Colour = "WHITE";
```
(ii)
```
SELECT VehicleName, Make, Capacity
FROM CABHUB
ORDER BY Capacity;
```
(iii)
```
SELECT MAX (Charges)
FROM CABHUB;
```

Q 9. Consider the following tables ACTIVITY and COACH and answer the following parts of this question:

Table: ACTIVITY

Acode	Activity Name	Stadium	Participants Num	Prize Money	Schedule Date
1001	Relay 100 × 4	Star Annex	16	10000	23-Jan-04
1002	High Jump	Star Annex	10	12000	12-Dec-03
1003	Shot Put	Super Power	12	8000	14-Feb-04
1005	Long Jump	Star Annex	12	9000	01-Jan-04
1008	Discuss Throw	Super Power	10	15000	19-Mar-04

Table: COACH

Pcode	Name	Acode
1	Ahmad Hussain	1001
2	Ravinder	1008
3	Janila	1001
4	Naaz	1003

Give the output of the following SQL queries:

(i)
```
SELECT COUNT (DISTINCT ParticipantsNum)
FROM ACTIVITY;
```
(ii)
```
SELECT MAX(ScheduleDate),MIN(Schedule
Date) FROM ACTIVITY;
```
(iii)
```
SELECT Name, ActivityName FROM ACTIVITY
A,COACH
WHERE A. Acode = C.Acode AND A. Participants
Num = 10;
```

Ans. (i) 3

(ii)
```
MAX(ScheduleDate)MIN(ScheduleDate)
19-Mar-04          12-Dec-03
```
(iii)
```
Name               ACTIVITYNAME
Ravinder           Discuss Throw
```

COMMON ERROR

SQL query is not read properly or there may be error in finding the output correctly.

Q 10. Consider the following tables GAMES and PLAYER and answer the following parts of this question:

Table: GAMES

GCode	GameName	Type	Number	Prize Money	Schedule Date
101	Carrom Board	Indoor	2	5000	23-Jan-2004
102	Badminton	Outdoor	2	12000	12-Dec-2003
103	Table Tennis	Indoor	4	8000	14-Feb-2004
105	Chess	Indoor	2	9000	01-Jan-2004
108	Lawn Tennis	Outdoor	4	25000	19-Mar-2004

Table: PLAYER

PCode	Name	GCode
1	Nabi Ahmed	101
2	Ravi Sahai	108
3	Jatin	101
4	Nazneen	103

Give the output of the following SQL queries:

(i)
```
SELECT COUNT (DISTINCT Number) FROM
GAMES;
```
(ii)
```
SELECT MAX (ScheduleDate),
MIN(ScheduleDate) FROM GAMES;
```
(iii)
```
SELECT Name,GameName FROM GAMES G,
PLAYER P
WHERE G. GCode = P. GCode AND G.
PrizeMoney > 10000;
```

Ans. (i) 2

(ii)
```
MAX (ScheduleDate)    MIN(ScheduleDate)
19-Mar-2004           12-Dec-2003
```
(iii)
```
Ravi Sahai            Lawn Tennis
```

Q 11. Consider the tables Patient given below and write SQL commands.

Table: Patient

PatientId	Name	City	Phone	Dateofadm	Department
1000001	Ritvik Garg	Delhi	68476213	2021-12-10	Surgery
1000002	Rahil Arora	Mumbai	36546321	2022-01-08	Medicine
1000003	Mehak Bhatt	Delhi	68421879	2022-02-02	Cardiology
1000004	Soumik Rao	Delhi	26543266	2022-01-11	Medicine
1000005	Suresh Sood	Bengaluru	65432442	2021-03-09	Surgery

Write SQL queries for the following:

(i) Display the details of all patients who were admitted in January.

(ii) Count the total number of patients from Delhi.

(iii) Display the last 2 digits of the Patientid of all patients from Surgery Department. *[CBSE 2023]*

Ans. (i)
```
SELECT * FROM Patient WHERE YEAR (Dateofadm) = 01;
```
(ii)
```
SELECT COUNT (*) FROM Patient WHERE CITY = "DELHI";
```
(iii)
```
SELECT RIGHT (Patientid, 2) FROM Patient WHERE Department = "Surgery";
```

Q 12. Consider the following tables WORKER and PAYLEVEL and answer the following parts of this question:

Table: WORKER

ECODE	NAME	DESIG	PLEVEL	DOJ	DOB
11	Radhe Shyam	Supervisor	P001	13-Sep-2004	23-Aug-1981
12	Chander Nath	Operator	P003	22-Feb-2010	12-Jul-1987
13	Fizza	Operator	P003	14-Jun-2009	14-Oct-1983
15	Ameen Ahmed	Mechanic	P002	21-Aug-2006	13-Mar-1984
18	Sanya	Clerk	P002	19-Dec-2005	09-Jun-1983

Table: PAYLEVEL

PLEVEL	PAY	ALLOWANCE
P001	26000	12000
P002	22000	10000
P003	12000	6000

Give the output of the following SQL queries:

(i)
```
SELECT COUNT(PLEVEL), PLEVEL FROM WORKER GROUP BY PLEVEL;
```
(ii)
```
SELECT MAX(DOB), MIN(DOJ) FROM WORKER;
```
(iii)
```
SELECT Name, Pay FROM WORKER W, PAYLEVEL P WHERE W.PLEVEL = P.PLEVEL AND W.ECODE < 13;
```

Ans. (i)

1	P001,	
2	P003,	
2	P002	

(ii) 12-Jul-1987 13-Sep-2004

(iii)

Name	Pay
Radhe Shyam	26000
Chander Nath	12000

Q 13. Consider the following tables EMPLOYEE and SALGRADE and answer the following parts of this question:

Table: EMPLOYEE

ECODE	NAME	DESIG	SGRADE	DOJ	DOB
101	Abdul Ahmed	EXECUTIVE	S03	23-Mar-2003	13-Jan-1980
102	Ravi Chander	HEAD-IT	S02	12-Feb-2010	22-Jul-1987
103	John Ken	RECEPTIONIST	S03	24-Jun-2009	24-Feb-1983
105	Nazar Ameen	GM	S02	11-Aug-2006	03-Mar-1984
108	Priyam Sen	CEO	S01	29-Dec-2004	19-Jan-1982

Table: SALGRADE

SGRADE	SALARY	HRA
S01	56000	18000
S02	32000	12000
S03	24000	8000

Give the output of the following SQL queries:

(i)
```
SELECT COUNT (SGRADE), SGRADE FROM EMPLOYEE GROUP BY SGRADE;
```
(ii)
```
SELECT MIN(DOB), MAX(DOJ) FROM EMPLOYEE;
```
(iii)
```
SELECT NAME, SALARY FROM EMPLOYEE E, SALGRADE S
WHERE E.SGRADE = S.SGRADE AND E.ECODE < 103;
```

Ans. (i)

COUNT	SGRADE
2	S03
2	S02
1	S01

(ii) 13-Jan-1980 12-Feb-2010

(iii)

NAME	SALARY
Abdul Ahmed	24000
Ravi Chander	32000

Q 14. Given the following table:

Table: CLUB

COACH-ID	COACHNAME	AGE	SPORTS	DATOFAPP	PAY	SEX
1	KUKREJA	35	KARATE	27/03/1996	1000	M
2	RAVINA	34	KARATE	20/01/1998	1200	F
3	KARAN	34	SQUASH	19/02/1998	2000	M
4	TARUN	33	BASKETBALL	01/01/1998	1500	M
5	ZUBIN	36	SWIMMING	12/01/1998	750	M
6	KETAKI	36	SWIMMING	24/02/1998	800	F
7	ANKITA	39	SQUASH	20/02/1998	2200	F
8	ZAREEN	37	KARATE	22/02/1998	1100	F
9	KUSH	41	SWIMMING	13/01/1998	900	M
10	SHAILYA	37	BASKETBALL	19/02/1998	1700	M

Give the output of following SQL statements:

(i) `SELECT COUNT(DISTINCT SPORTS) FROM Club;`

(ii) `SELECT MIN(Age) FROM CLUB WHERE Sex = 'F';`

(iii) `SELECT AVG(Pay) FROM CLUB WHERE Sports = 'KARATE';`

Ans. (i)

COUNT (DISTINCT SPORTS)
4

(ii)

MIN(Age)
34

(iii)

AVG(Pay)
1100.0

Q 15. Given the following tables with their respective column names:

ORDERS
OrderId
OrderDate
CustomerId
TotalAmount

ORDERITEMS
OrderId
ProductId
Quantity

CUSTOMERS
CustomerId
Name
City
Country
Phone

PRODUCTS
ProductId
ProductName
SupplierId
UnitPrice

(i) Consider the Orders and Customers tables given above. Write an SQL query to list all customer details (name, phone) along with order date.

(ii) Consider the Orders and OrderItems tables given above. Write an SQL query to list order details along with product ids and quantities.

(iii) Consider the Orders, OrderItems and Products tables given above. Write a query to list all orders with product names, quantities and prices, arranged orderId wise.

Ans. (i)
```
SELECT Name, City, Country, Orderdate
FROM Orders, Customers
WHERE Orders. CustomerId = Customers.
Customer.Id;
```

(ii)
```
SELECT Orders. OrderId, OrderDate,
ProductId, Quantity
FROM Orders, OrderItems
WHERE Orders.OrderId = OrderItems.
OrderId;
```

(iii)
```
SELECT O. OrderINTEGER, O.OrderDate,
P.ProductName,
    I.Quantity, P.UnitPrice
FROM Orders O, Products P, OrderItems I
WHERE O. OrderId = I.OrderId
AND P. ProductId = I.ProductId
ORDER BY O. Order Id;
```

Long Answer Type Questions

Q 1. Consider the following table Schooldata:

Table : Schooldata

Admno	Name	Grade	Club	Marks	Gender
20150001	Sargam Singh	12	STEM	86	Male
20140212	Alok Kumar	10	SPACE	75	Male
20090234	Mohit Gaur	11	SPACE	84	Male
20130216	Romil Malik	10	READER	91	Male
20190227	Tanvi Batra	11	STEM	70	Female
20120200	Nomita Ranjan	12	STEM	64	Female

Write SQL queries for the following:

(i) Display the average Marks secured by each Gender.

(ii) Display the minimum Marks secured by the students of Grade 10.

(iii) Display the total number of students in each Club where number of students are more than 1.

Or

Display the maximum and minimum marks secured by each gender.

Ans. (i)
```
SELECT Gender, Avg (Marks) FROM
Schooldata GROUP BY Gender;
```

(ii)
```
SELECT MIN (Marks) FROM Schooldata
WHERE Grade = 10;
```

(iii)
```
SELECT Club, COUNT (DISTINCT Club)
FROM Schooldata GROUP BY Club HAVING
COUNT (DISTINCT Club) > 1;
```

Or

```
SELECT Gender, MAX (Marks), MIN (Marks)
FROM Schooldata GROUP BY Gender;
```

Q 2. Answer the following questions:

Database table empl

EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
8369	SMITH	CLERK	8902	1990-12-18	800.00	NULL	20
8499	ANYA	SALESMAN	8698	1991-02-20	1600.00	300.00	30
8521	SETH	SALESMAN	8698	1991-02-22	1250.00	500.00	30
8566	MAHADEVAN	MANAGER	8839	1991-04-02	2985.00	NULL	20
8654	MOMIN	SALESMAN	8698	1991-09-28	1250.00	1400.00	30
8698	BINA	MANAGER	8839	1991-05-01	2850.00	NULL	30
8839	AMIR	PRESIDENT	NULL	1991-11-18	5000.00	NULL	10
8844	KULDEEP	SALESMAN	8698	1991-09-08	1500.00	0.00	30
8882	SHIVANSH	MANAGER	8839	1991-06-09	2450.00	NULL	10
8886	ANOOP	CLERK	8888	1993-01-12	1100.00	NULL	20
8888	SCOTT	ANALYST	8566	1992-12-09	3000.00	NULL	20
8900	JATIN	CLERK	8698	1991-12-03	950.00	NULL	30
8902	FAKIR	ANALYST	8566	1991-12-03	3000.00	NULL	20
8934	MITA	CLERK	8882	1992-01-23	1300.00	NULL	10

(i) Calculate average salary of all employees listed in table empl.

(ii) Count number of records in table empl.

(iii) Count number of jobs in table empl.

(iv) How many distinct jobs are listed in table empl?

(v) Display maximum salary from table empl.

Ans. (i)
```
mysql > SELECT AVG(sal) "Average"
FROM empl;
```

Average
2073.928571

```
1 row in set (0.01 sec)
```

(ii)
```
mysql> SELECT COUNT(*) "Total"
FROM empl;
```

Total
14

```
1 row in set (0.00 sec)
```

(iii)
```
mysql> SELECT COUNT(job) "Job Count"
FROM empl;
```

Job Count
14

```
1 row in set (0.01 sec)
```

(iv)
```
mysql> SELECT COUNT(DISTINCT job)
"Distinct Jobs"
FROM empl;
```

Distinct Jobs
5

```
1 row in set (0.04 sec)
```

(v)
```
mysql> SELECT MAX (sal) "'Maximum
Salary"
FROM empl;
```

Maximum Salary
5000.00

```
1 row in set (0.01 sec)
```

Q 3. In a Database, there are two tables given below:

Table: EMPLOYEE

EMPLOYEEID	NAME	SALES	JOBID
E1	SUMIT SINHA	1100000	102
E2	VIJAY SINGH TOMAR	1300000	101
E3	AJAY RAJPAL	1400000	103
E4	MOHIT RAMNANI	1250000	102
E5	SHAILJA SINGH	1450000	103

Table: JOB

JOBID	JOBTITLE	SALARY
101	President	200000
102	Vice-President	125000
103	Administration Assistant	80000
104	Accounting Manager	70000
105	Accountant	65000
106	Sales Manager	80000

Write SQL queries for the following:

(i) To display employee ids, names of employees, job ids with corresponding job titles.

(ii) To display names of employees, sales and corresponding job titles who have achieved sales more than 1300000.

(iii) To display names and corresponding job titles of those employees who have 'SINGH' (anywhere) in their names.

(iv) Identify foreign key in the table EMPLOYEE.

(v) Write SQL command to change the JOBID to 104 of the EMPLOYEE with ID as E4 in the table 'EMPLOYEE'.

Ans. (i)
```
SELECT EMPLOYEEID, NAME, EMPLOYEE.
JOBID, JOBTITLE FROM EMPLOYEE NATURAL
JOIN ON JOB;
```

(ii)
```
SELECT NAME, SALES, JOBTITLE FROM
EMPLOYEE, JOB WHERE EMPLOYEE.JOBID =
JOB.JOBID AND SALES> 1300000;
```

(iii)
```
SELECT NAME, JOBTITLE FROM EMPLOYEE,
JOB WHERE EMPLOYEE.JOBID = JOB.JOBID
AND NAME LIKE "%SINGH%" ;
```

(iv) JOBID

(v)
```
UPDATE EMPLOYEE SET JOBID = 104 WHERE
EMPLOYEEID = "E4";
```

Q 4. Answer the questions based on following tables:

Table: Venue1

Match_no	City
1	DELHI
2	MOHALI
3	KOCHI
4	MUMBAI
5	BENGALURU
6	CHENNAI

6 rows in set (0.05 sec)

Table: Venue2

Match_no	City
1	MOHALI
2	BENGALURU
3	MUMBAI
4	BENGALURU
5	MUMBAI
6	DELHI
7	BENGALURU

7 rows in set (0.05 sec)

(i) Write an SQL query to union cities from tables venue1 and venue2.

(ii) Write an SQL query to union cities from tables venue1 and venue2.

(iii) Write an SQL query to union cities from tables venue1 and venue2 containing all the rows.

(iv) Write an SQL query to get cities only in table venue1 and not in table venue2.

(v) Write an SQL query to get cities common to tables venue1 and venue2.

Ans. (i)
```
SELECT city FROM venue1
UNION
SELECT city FROM venue2;
```
(ii)
```
SELECT city FROM venue2
UNION
SELECT city FROM venue1;
```
(iii)
```
SELECT city FROM venue1
UNION ALL
SELECT city FROM venue2;
```
(iv)
```
SELECT v1.city FROM venue1 v1
LEFT JOIN venue2 v2
ON v1.city = v2.city
WHERE v2.city IS NULL; :
```
(v)
```
SELECT DISTINCT v1.city
FROM Venue1 v1
INNER JOIN Venue2 v2
On v1. city = v2.city;
```

Q 5. In a Database Company, there are two tables given below:

Table: SALES

SALESMANID	NAME	SALES	LOCATIONID
S1	ANITA SINGH ARORA	250000	102
S2	Y.P. SINGH	1300000	101
S3	TINA JAISWAL	1400000	103
S4	GURDEEP SINGH	1250000	102
S5	SIMI FAIZAL	1450000	103

Table: LOCATION

LOCATIONID	LOCATIONNAME
101	Delhi
102	Mumbai
103	Kolkata
104	Chennai

Write SQL queries for the following:

(i) To display SalesmanID, names of salesman, LocationID with corresponding location names.

(ii) To display names of salesman, sales and corresponding location names who have achieved Sales more than 1300000.

(iii) To display names of those salesman who have 'SINGH' in their names.

(iv) Identify Primary key in the table SALES. Give reason for your choice.

(v) Write SQL command to change the LocationID to 104 of the Salesman with ID as S3 in the table 'SALES'.

Ans. (i)
```
SELECT SALESMANID, NAME, LOCATIONID,
LOCATIONNAME
FROM SALES S, LOCATION L
WHERE S .LOCATIONID = L.LOCATIONID;
```
(ii)
```
SELECT NAME, SALES, LOCATIONNAME
FROM SALES S, LOCATION L
WHERE S.LOCATIONID = L.LOCATIONID
AND SALES> 1300000;
```
(iii)
```
SELECT NAME
FROM SALES
WHERE NAME LIKE '%SINGH%';
```
(iv)
```
Primary Key: SALESMANID
Reason: It uniquely identifies all
ROWS in the table and does not
contain empty/zero or null values.
```
(v)
```
UPDATE SALES
SET LOCATIONID = 104
WHERE SALESMANID = 'S3';
```

Q 6. Consider the table and write the output of following queries:

Table: PRODUCT_MAST

PRODUCT	COMPANY	QTY	RATE	COST
Item1	Com1	2	10	20
Item2	Com2	3	25	75
Item3	Com1	2	30	60
Item4	Com3	5	10	50
Item5	Com2	2	20	40
Item6	Cpm1	3	25	75
Item7	Com1	5	30	150
Item8	Com1	3	10	30
Item9	Com2	2	25	50
Item10	Com3	4	30	120

(i)
```
SELECT COUNT(*)
FROM PRODUCT_MAST;
```
(ii)
```
SELECT COUNT(*)
FROM PRODUCT_MAST;
WHERE RATE>=20;
```

(iii)
```
SELECT COUNT(DISTINCT COMPANY)
FROM PRODUCT_MAST;
```
(iv)
```
SELECT COMPANY, COUNT(*)
FROM PRODUCT_MAST
GROUP BY COMPANY;
```
(v)
```
SELECT COMPANY, COUNT(*)
FROM PRODUCT_MAST
GROUP BY COMPANY
HAVING COUNT(*)>2;
```

Ans. (i) 10
(ii) 7
(iii) 3
(iv) Com1 5
Com2 3
Com3 2
(v) Com1 5
Com2 3

Q 7. Consider the table and answer the output of following queries:

Table: PRODUCT_MAST

PRODUCT	COMPANY	QTY	RATE	COST
Item1	Com1	2	10	20
Item2	Com2	3	25	75
Item3	Com1	2	30	60
Item4	Com3	5	10	50
Item5	Com2	2	20	40
Item6	Cpm1	3	25	75
Item7	Com1	5	30	150
Item8	Com1	3	10	30
Item9	Com2	2	25	50
Item10	Com3	4	30	120

(i)
```
SELECT SUM(COST)
FROM PRODUCT_MAST;
```
(ii)
```
SELECT SUM(COST)
FROM PRODUCT_MAST
WHERE QTY>3;
```
(iii)
```
SELECT SUM(COST)
FROM PRODUCT_MAST
WHERE QTY>3
GROUP BY COMPANY;
```
(iv)
```
SELECT COMPANY, SUM(COST)
FROM PRODUCT_MAST
GROUP BY COMPANY
HAVING SUM(COST)>=170;
```
(v)
```
SELECT AVG(COST)
FROM PRODUCT_MAST;
```

Ans. (i) 670
(ii) 320
(iii) Com1 150
Com2 170
(iv) Com1 335
Com3 170
(v) 67.00

Q 8. Consider the table and write the output of following queries:

Table: EMPLOYEE

EMP_ID	EMP_NAME	CITY	SALARY	AGE
1	Angelina	Chicago	200000	30
2	Robert	Austin	300000	26
3	Christian	Denver	100000	42
4	Kristen	Washington	500000	29
5	Russell	Los Angeles	200000	36
6	Marry	Canada	600000	48

Table: PROJECT

PROJECT_NO	EMP_ID	DEPARTMENT
101	1	Testing
102	2	Development
103	3	Designing
104	4	Development

(i)
```
SELECT EMPLOYEE.EMP_NAME, PROJECT.
DEPARTMENT
FROM EMPLOYEE
INNER JOIN PROJECT
ON PROJECT.EMP_ID = EMPLOYEE.EMP_ID;
```
(ii)
```
SELECT EMPLOYEE.EMP_NAME, PROJECT.
DEPARTMENT
FROM EMPLOYEE
LEFT JOIN PROJECT
ON PROJECT.EMP_ID = EMPLOYEE.EMP_ID;
```
(iii)
```
SELECT EMPLOYEE.EMP_NAME, PROJECT.
DEPARTMENT
FROM EMPLOYEE
RIGHT JOIN PROJECT
ON PROJECT.EMP_ID = EMPLOYEE.EMP_ID;
```

Ans. (i)

EMP_NAME	DEPARTMENT
Angelina	Testing
Robert	Development
Christian	Designing
Kristen	Development

(ii)

EMP_NAME	DEPARTMENT
Angelina	Testing
Robert	Development
Christian	Designing
Kristen	Development
Russell	NULL
Marry	NULL

(iii)

EMP_NAME	DEPARTMENT
Angelina	Testing
Robert	Development
Christian	Designing
Kristen	Development

Q 9. Consider the table and answer the following questions:

The First table

ID	NAME
1	Jack
2	Harry
3	Jackson

The Second table

ID	NAME
3	Jackson
4	Stephan
5	David

(i)
```
SELECT * FROM First
UNION
SELECT * FROM Second;
```
(ii)
```
SELECT * FROM First
UNION ALL
SELECT * FROM Second;
```
(iii)
```
SELECT * FROM First
INTERSECT
SELECT * FROM Second;
```
(iv)
```
SELECT * FROM First
MINUS
SELECT * FROM Second;
```
(v) Differentiate between UNION AND UNION ALL.

Ans. (i)

ID	NAME
1	Jack
2	Harry
3	Jackson
4	Stephan
5	David

(ii)

ID	NAME
1	Jack
2	Harry
3	Jackson
3	Jackson
4	Stephan
5	David

(iii)

ID	NAME
3	Jackson

(iv)

ID	NAME
1	Jack
2	Harry

(v) **UNION:** The SQL UNION operation is used to combine the result of two or more SQL SELECT queries. In the UNION operation, all the number of datatype and columns must be same in both the tables on which UNION operation is being applied. The UNION operation eliminates the duplicate rows from its result set.

UNION ALL: UNION ALL operation is equal to the UNION operation. It returns the set without removing duplication and sorting the data.

Chapter Test

Multiple Choice Questions

Q 1. An SQL ..... clause combines records from two or more tables in a database.

a. EQUI JOIN
b. CARTESIAN
c. JOIN
d. NATURAL

Q 2. An ..... is a specific type of join that uses only equality comparisons in the join-condition.

a. EQUI JOIN b. CARTESIAN
c. Both a. and b. d. Natural

Q 3. ..... JOIN selects all data starting from the left table and matching rows in the right table.

a. EQUI b. NATURAL
c. LEFT d. RIGHT

Q 4. ..... Join is a reversed version of the LEFT JOIN.

a. EQUI b. NATURAL
c. LEFT d. RIGHT

Q 5. ..... join produces a data set that includes only those rows from the left table which have matching rows from the right table.

a. UNION b. OUTER
c. EXCEPT d. INNER

Fill in the Blanks

Q 6. ..... returns all rows from both the SELECT queries after removing duplicate rows between the two SELECT statements.

Q 7. The ..... operation combines results of two SELECT statements and returns only those rows in the final result, which belong to the first set of the result.

Q 8. The INTERSECT operation can be simulated in MySQL using ..... JOIN.

Assertion & Reason Type Questions

Directions (Q. Nos. 9-10): *In the questions given below, there are two statements marked as Assertion (A) and Reason (R). Read the statements and choose the correct option.*

a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
b. Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
c. Assertion (A) is true, but Reason (R) is false.
d. Assertion (A) is false, but Reason (R) is true.

Q 9. Assertion (A): UNION (∪) operation is used to combine the selected rows of two tables at a time. If some rows are the same in both the tables, then the result of the UNION operation will show those rows only once.
Reason (R): In order to display the number of records that matches a particular criteria in the table, we have to use COUNTBY(*) with WHERE clause.

Q 10. Assertion (A): Cartesian product operation combines tuples from two rows. It results in all pairs of rows from the two input relations, regardless of whether or not they have the same values on common attributes. It is denoted as 'XY'.
Reason (R): While using the JOIN clause of SQL, we specify conditions on the related attributes of two tables within the FROM clause.

Case Study Based Questions

Q 11. SQL is a language to operate databases; it includes database creation, deletion, fetching rows, modifying rows, etc. SQL is an ANSI (American National Standards Institute) standard language, but there are many different versions of the SQL language. SQL is Structured Query Language, which is a computer language for storing, manipulating and retrieving data stored in a relational database. SQL is the standard language for Relational Database System. All the Relational Database Management Systems (RDMS) like MySQL, MS Access, Oracle, Sybase, Informix, Postgres and SQL Server use SQL as their standard database language. The standard SQL commands to interact with relational databases are CREATE, SELECT, INSERT, UPDATE, DELETE and DROP.

(i) Here which of the following displays the unique values of the column?
SELECT ..... dept_name
FROM Instructor;
a. All b. From
c. Distinct d. Name

(ii) The ..... clause allows us to select only those rows in the result relation of the ..... clause that satisfy a specified predicate.
a. WHERE, FROM b. FROM, SELECT
c. SELECT, FROM d. FROM, WHERE

(iii) The query given below will not give an error. Which one of the following has to be replaced to get the desired output?
SELECT ID, name, dept name, salary * 1.1
WHERE instructor;
a. SALARY*1.1 b. ID
c. WHERE d. INSTRUCTOR

(iv) The ..... clause is used to list the attributes desired in the result of a query.
a. WHERE b. SELECT
c. FROM d. DISTINCT

(v) This Query can be replaced by which one of the following?
SELECT name, course_id
FROM instructor, teaches
WHERE instructor_ID=teaches_ID;
a. `SELECT name, course_id FROM teaches, instructor WHERE instructor_id=course_id;`
b. `SELECT name, course_id from instructor NATURAL JOIN teaches;`
c. `SELECT name, course_id FROM instructor;`
d. `SELECT course_id from instructor join teaches;`

Q 12. Consider the below two tables for reference and answer the following questions:

Table–Employee Details

EmpId	FullName	ManagerID	Date of Joining	City
121	John Snow	321	31/01/2014	Toronto
321	Walter White	986	31/01/2015	California
421	Kuldeep Rana	876	30/01/2016	New Delhi

Table–EmployeeSalary

EmpId	Project	Salary	Variable
121	P1	8000	500
321	P2	10000	1000
421	P1	12000	0

(i) Write an SQL query to fetch all the EmpIds which are present in either of the tables– 'EmployeeDetails' and 'EmployeeSalary'.

(ii) Write an SQL query to fetch common records between two tables.

(iii) Write an SQL query to fetch records that are present in one table but not in another table.

(iv) Write an SQL query to fetch the EmpIds that are present in both the tables– 'EmployeeDetails' and 'EmployeeSalary'.

(v) Write an SQL query to fetch the EmpIds that are present in EmployeeDetails but not in EmployeeSalary.

Very Short Answer Type Questions

Q 13. What does INTERSECT do?

Q 14. What does MINUS operation do?

Q 15. A table FLIGHT has 4 rows and 2 columns and another table (*AIR HOSTESS*) has 3 rows and 4 columns. How many rows and columns will be there if we obtain the Cartesian product of these two tables?

Q 16. Table Employee has 4 records and Table Dept has 3 records in it. Mr. Jain wants to display all information stored in both of these related tables. He forgot to specify equi join condition in the query. How many rows will get displayed on execution of this query?

Short Answer Type-I Questions

Q 17. Consider the table and answer the output of following queries:

Table: PRODUCT_MAST

PRODUCT	COMPANY	QTY	RATE	COST
Item1	Com1	2	10	20
Item2	Com2	3	25	75
Item3	Com1	2	30	60
Item4	Com3	5	10	50
Item5	Com2	2	20	40
Item6	Cpm1	3	25	75
Item7	Com1	5	30	150
Item8	Com1	3	10	30
Item9	Com2	2	25	50
Item10	Com3	4	30	120

(i)
```
SELECT MAX(RATE)
FROM PRODUCT_MAST;
```
(ii)
```
SELECT MIN(RATE)
FROM PRODUCT_MAST;
```

Q 18. Consider the table and answer the output of following queries:

Table: EMPLOYEE

EMP_ID	EMP_NAME	CITY	SALARY	AGE
1	Angelina	Chicago	200000	30
2	Robert	Austin	300000	26
3	Christian	Denver	100000	42
4	Kristen	Washington	500000	29
5	Russell	Los Angeles	200000	36
6	Marry	Canada	600000	48

Table: PROJECT

PROJECT_NO	EMP_ID	DEPARTMENT
101	1	Testing
102	2	Development
103	3	Designing
104	4	Development

```
SELECT EMPLOYEE.EMP_NAME, PROJECT
DEPARTMENT
FROM EMPLOYEE
FULL JOIN PROJECT
ON PROJECT.EMP_ID = EMPLOYEE.EMP_ID;
```

Short Answer Type-II Questions

Q 19. In a Database - SAMS and VENDOR are two tables with the following information. Write MySQL queries for (i) to (iii), based on tables SAMS and VENDOR:

Table: SAMS

ICode	IName	Price	Colour	VCode
S001	Refrigerator	20000	Blue	P01
S002	Mobile Phone	45000	Black	P02
S003	LCD	60000	Silver	P03
S004	Washing Machine	12500	Smoke	P01
S005	Air Conditioner	16000	White	P03

Table: VENDOR

VCode	VNAME
P01	Satish
P02	Manoj
P03	Subodh
P04	Jacob

(i) To display ICode, IName and VName of all the vendors, who manufacture "Refrigerator".

(ii) To display IName, ICode, VName and Price of all the products whose price is more than 20000.

(iii) To display vendor names and names of all items manufactured by vendor whose code is "P03".

Q 20. In a Database Multiplexes, there are two tables with the following data. Write MySQL queries for (i) and (iii), which are based on Ticket Details and AgentDetails:

Table: TicketDetails

Tcode	NAME	Tickets	A_code
S001	Meena	7	A01
S002	Vani	5	A02
S003	Meena	9	A01
S004	Karish	2	A03
S005	Suraj	1	A02

Table: AgentDetails

ACode	AName
A01	Mr. Robin
A02	Mr. Ayush
A03	Mr. Trilok
A04	Mr. John

(i) To display Tcode; Name and Aname of all the records where the number of tickets sold is more than 5.

(ii) To display total number of tickets booked by agent "Mr. Ayush".

(iii) To display Acode, Aname and corresponding Tcode where Aname ends with "k".

Long Answer Type Questions

Q 21. Consider the following tables RESORT and OWNEDBY and answer the question:

Table : RESORT

RCODE	PLACE	RENT	TYPE	STARTDATE
R001	GOA	15000	5 STAR	12-Jan-02
R002	HIMACHAL	9000	4 STAR	20-Dec-07
R003	KERALA	12500	5 STAR	10-Mar-06
R004	HIMACHAL	10500	2 STAR	25-Nov-05
R005	GUJARAT	8000	4 STAR	01-Jan-03
R006	GOA	18000	7 STAR	30-Mar-08
R007	ODISHA	7500	2 STAR	12-Apr-09
R008	KERALA	11000	5 STAR	03-Mar-03
R009	HIMACHAL	9000	2 STAR	15-Oct-08
R010	GOA	13000	5 STAR	12-Apr-06

Table : OWNEDBY

Place	Owner
GOA	RAJ RESORTS
KERALA	KTDC
HIMACHAL	HTDC
GUJARAT	MAHINDRA RESORTS
ODISHA	OTDC

(i) Write SQL commands for the following statements:

(a) To display the RCODE and PLACE of all '5 STAR' resorts in the alphabetical order of the place from table RESORT.

(b) To display the maximum and minimum rent for each type of resort from table RESORT.

(c) To display the details of all resorts which are started after 31-DEC-05 from table RESORT.

(d) Display the OWNER of all '5 STAR' resorts from tables RESORT and OWNEDBY.

(ii) Give output for the SQL query:

```
SELECT OWNER FROM RESORT OWNED BY
B WHERE (A.TYPE START' AND A.PLACE
B.PLACE);
```

Q 22. Consider the following tables STORE and SUPPLIERS and answer the question:

Table: STORE

ItemNo	Item	Scode	Qty	Rate	LastBuy
2005	Sharpener Classic	23	60	8	31-Jun-09
2003	Ball Pen 0.25	22	50	25	01-Feb-10
2002	Gel Pen Premium	21	150	12	24-Feb-10
2006	Gel Pen Classic	21	250	20	11-Mar-09
2001	Eraser Small	22	220	6	19-Jan-09
2004	Eraser Big	22	110	8	02-Dec-09
2009	Ball Pen 0.5	21	180	18	03-Nov-09

Table: STORE

Scode	Sname
21	Premium Stationers
23	Soft Plastics
22	Tetra Supply

(i) Write SQL commands for the following statements:

(a) To display details of all the items in the STORE table in ascending order of LastBuy.

(b) To display ItemNo and Item name of those items from STORE table whose Rate is more than 15 Rupees.

(c) To display the details of those items whose supplier code (Scode) is 22 or Quantity in STORE (Qty) is more than 110 from the table STORE.

(d) To display minimum Rate of items for each supplier individually as per Scode from the table STORE.

(ii) Give the output for SQL queries:

```
SELECT COUNT(DISTINCT Scode) FROM
STORE;
```