A. Rollup, Partial Rollup, Cube, Partial Cube

Q1. Create a table Sales with the attribute dept_id, deptname, year_of_sales, region and profit.

Perform the rollup operation on this table.

```
SQL> create table Sales04(dept_id number,dept_name varchar(10),years_of_sales number,region varchar(10),profit number);

Table created.
```

Display year wise total profit.

```
SQL> select years_of_sales,sum(profit) from Sales04 group by rollup(years_of_sales);

YEARS_OF_SALES SUM(PROFIT)
-------------- -----------
          2020     1060000
          2021     1570000
          2022     2080000
                   4710000
```

Display year wise total profit of each region.

```
SQL> select years_of_sales,region,sum(profit) from Sales04 group by rollup(years_of_sales,region);

YEARS_OF_SALES REGION     SUM(PROFIT)
-------------- ---------- -----------
          2020 Delhi            900000
          2020 Mumbai           160000
          2020                 1060000
          2021 Delhi            900000
          2021 Mumbai           670000
          2021                 1570000
          2022 Delhi           1200000
          2022 Mumbai           880000
          2022                 2080000
                               4710000

10 rows selected.
```

Display year wise, region wise and department wise total profit for the department “IT”.

```
SQL> select years_of_sales,region,dept_name,sum(profit) from Sales04 group by rollup(years_of_sales,region,dept_name) ha
ving dept_name = 'IT';

YEARS_OF_SALES REGION     DEPT_NAME  SUM(PROFIT)
-------------- ---------- ---------- -----------
          2021 Mumbai     IT              620000
          2022 Mumbai     IT              820000
          2022 Delhi      IT              900000
          2021 Delhi      IT              700000
          2020 Delhi      IT              800000
          2020 Mumbai     IT              120000

6 rows selected.
```

Display year wise total profit of each department.

```
SQL> select years_of_sales,dept_name,sum(profit) from Sales04 group by rollup(years_of_sales,dept_name);

YEARS_OF_SALES DEPT_NAME  SUM(PROFIT)
-------------- ---------- -----------
          2020 HR              140000
          2020 IT              920000
          2020                1060000
          2021 HR              250000
          2021 IT             1320000
          2021                1570000
          2022 HR              360000
          2022 IT             1720000
          2022                2080000
                              4710000

10 rows selected.
```

Display region wise total profit of each department.

```
SQL> select region,dept_name,sum(profit) from Sales04 group by rollup(region,dept_name);

REGION     DEPT_NAME  SUM(PROFIT)
---------- ---------- -----------
Delhi      HR              600000
Delhi      IT             2400000
Delhi                     3000000
Mumbai     HR              150000
Mumbai     IT             1560000
Mumbai                    1710000
                          4710000
```

Display region wise total profit if total profit > 100000.

```
SQL> select region,sum(profit) from Sales04 group by rollup(region,profit) having profit>100000;

REGION     SUM(PROFIT)
---------- -----------
Delhi           800000
Mumbai          120000
Mumbai          820000
Delhi           700000
Mumbai          620000
Delhi           300000
Delhi           200000
Delhi           900000

8 rows selected.
```

Display region wise total profit.

```
SQL> select region,sum(profit) from Sales04 group by rollup(region);

REGION     SUM(PROFIT)
---------- -----------
Delhi          3000000
Mumbai         1710000
               4710000
```

Display department wise total profit.

```
SQL> select dept_name,sum(profit) from Sales04 group by rollup(dept_name);

DEPT_NAME  SUM(PROFIT)
---------- -----------
HR              750000
IT             3960000
               4710000
```

Q2. Apply partial rollup on same table.

1. Display region wise total profit of each department by partially rolling the year.

```
SQL> select years_of_sales,region,dept_name,sum(profit) from Sales04 group by years_of_sales, rollup(region,dept_name);

YEARS_OF_SALES REGION     DEPT_NAME  SUM(PROFIT)
-------------- ---------- ---------- -----------
          2020 Delhi      HR              100000
          2020 Delhi      IT              800000
          2020 Delhi                      900000
          2020 Mumbai     HR               40000
          2020 Mumbai     IT              120000
          2020 Mumbai                     160000
          2020                           1060000
          2021 Delhi      HR              200000
          2021 Delhi      IT              700000
          2021 Delhi                      900000
          2021 Mumbai     HR               50000

YEARS_OF_SALES REGION     DEPT_NAME  SUM(PROFIT)
-------------- ---------- ---------- -----------
          2021 Mumbai     IT              620000
          2021 Mumbai                     670000
          2021                           1570000
          2022 Delhi      HR              300000
          2022 Delhi      IT              900000
          2022 Delhi                     1200000
          2022 Mumbai     HR               60000
          2022 Mumbai     IT              820000
          2022 Mumbai                     880000
          2022                           2080000
```

Q3. Implement Cube operation on the same table.

1. Display year, region and dept wise total profit using cube function.

```
SQL> select years_of_sales,region,dept_name,sum(profit) from Sales04 group by cube(years_of_sales,region,dept_name);

YEARS_OF_SALES REGION     DEPT_NAME  SUM(PROFIT)
-------------- ---------- ---------- -----------
                                        4710000
                          HR             750000
                          IT            3960000
               Delhi                    3000000
               Delhi      HR             600000
               Delhi      IT            2400000
               Mumbai                   1710000
               Mumbai     HR             150000
               Mumbai     IT            1560000
          2020                          1060000
          2020            HR             140000

YEARS_OF_SALES REGION     DEPT_NAME  SUM(PROFIT)
-------------- ---------- ---------- -----------
          2020            IT             920000
          2020 Delhi                     900000
          2020 Delhi      HR             100000
          2020 Delhi      IT             800000
          2020 Mumbai                    160000
          2020 Mumbai     HR              40000
          2020 Mumbai     IT             120000
          2021                          1570000
          2021            HR             250000
          2021            IT            1320000
          2021 Delhi                     900000

YEARS_OF_SALES REGION     DEPT_NAME  SUM(PROFIT)
-------------- ---------- ---------- -----------
          2021 Delhi      HR             200000
          2021 Delhi      IT             700000
          2021 Mumbai                    670000
          2021 Mumbai     HR              50000
          2021 Mumbai     IT             620000
          2022                          2080000
          2022            HR             360000
          2022            IT            1720000
          2022 Delhi                    1200000
          2022 Delhi      HR             300000
          2022 Delhi      IT             900000

YEARS_OF_SALES REGION     DEPT_NAME  SUM(PROFIT)
-------------- ---------- ---------- -----------
          2022 Mumbai                    880000
          2022 Mumbai     HR              60000
          2022 Mumbai     IT             820000
```

2. Display region and dept wise total profit using year_of_sales as partial cube dimension.

```
SQL> select years_of_sales,region,dept_name,sum(profit) from Sales04 group by years_of_sales,cube(region,dept_name);

YEARS_OF_SALES REGION     DEPT_NAME  SUM(PROFIT)
-------------- ---------- ---------- -----------
          2020                          1060000
          2020            HR             140000
          2020            IT             920000
          2020 Delhi                     900000
          2020 Delhi      HR             100000
          2020 Delhi      IT             800000
          2020 Mumbai                    160000
          2020 Mumbai     HR              40000
          2020 Mumbai     IT             120000
          2021                          1570000
          2021            HR             250000

YEARS_OF_SALES REGION     DEPT_NAME  SUM(PROFIT)
-------------- ---------- ---------- -----------
          2021            IT            1320000
          2021 Delhi                     900000
          2021 Delhi      HR             200000
          2021 Delhi      IT             700000
          2021 Mumbai                    670000
          2021 Mumbai     HR              50000
          2021 Mumbai     IT             620000
          2022                          2080000
          2022            HR             360000
          2022            IT            1720000
          2022 Delhi                    1200000

YEARS_OF_SALES REGION     DEPT_NAME  SUM(PROFIT)
-------------- ---------- ---------- -----------
          2022 Delhi      HR             300000
          2022 Delhi      IT             900000
          2022 Mumbai                    880000
          2022 Mumbai     HR              60000
          2022 Mumbai     IT             820000

27 rows selected.

SQL>
```

B. Rank and Dense Rank

Q1. Create a table student with attribute roll_num, name, subject, marks.

```
SQL> create table Student04(Roll_no number, name varchar(10), subject varchar(10), marks number);

Table created.
```

1. Display content of table.

```
SQL> select * from Student04;

   ROLL_NO NAME       SUBJECT         MARKS
---------- ---------- ---------- ----------
         1 Yash       Adbms              40
         1 Yash       JAVA               30
         2 Red        Adbms              40
         2 Red        JAVA               60
         3 Yellow     Adbms              50
         3 Yellow     JAVA               57
         4 Sid        Adbms              80
         4 Sid        JAVA               80
         5 Grey       Adbms              60
         5 Grey       JAVA               78

10 rows selected.
```

2. Assign sequence order for the student for the same subject based on their marks.

```
SQL> select Roll_no,name,subject,marks,rank() over (partition by subject order by marks) as rank from Student04;

   ROLL_NO NAME       SUBJECT         MARKS       RANK
---------- ---------- ---------- ---------- ----------
         1 Yash       Adbms              40          1
         2 Red        Adbms              40          1
         3 Yellow     Adbms              50          3
         5 Grey       Adbms              60          4
         4 Sid        Adbms              80          5
         1 Yash       JAVA               30          1
         3 Yellow     JAVA               57          2
         2 Red        JAVA               60          3
         5 Grey       JAVA               78          4
         4 Sid        JAVA               80          5

10 rows selected.
```

3. Assign sequential order for the student for the same subject based on their marks in descending order.

```
SQL> select Roll_no,name,subject,marks,rank() over (partition by subject order by marks desc) as rank from Student04;

   ROLL_NO NAME       SUBJECT         MARKS       RANK
---------- ---------- ---------- ---------- ----------
         4 Sid        Adbms              80          1
         5 Grey       Adbms              60          2
         3 Yellow     Adbms              50          3
         1 Yash       Adbms              40          4
         2 Red        Adbms              40          4
         4 Sid        JAVA               80          1
         5 Grey       JAVA               78          2
         2 Red        JAVA               60          3
         3 Yellow     JAVA               57          4
         1 Yash       JAVA               30          5

10 rows selected.
```

4. Assign sequential order using dense rank function.

```
SQL> select Roll_no,name,subject,marks,dense_rank() over (partition by subject order by marks desc) as rank from Student04;

   ROLL_NO NAME       SUBJECT         MARKS       RANK
---------- ---------- ---------- ---------- ----------
         4 Sid        Adbms              80          1
         5 Grey       Adbms              60          2
         3 Yellow     Adbms              50          3
         1 Yash       Adbms              40          4
         2 Red        Adbms              40          4
         4 Sid        JAVA               80          1
         5 Grey       JAVA               78          2
         2 Red        JAVA               60          3
         3 Yellow     JAVA               57          4
         1 Yash       JAVA               30          5

10 rows selected.
```

C. FIRST AND LAST

Q2.) 1. Display the lowest marks of each subject.

2. Display the highest marks of each subject.