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Consider the following table named Student in a relational database. The primary key of this table is rollNum.

rollNum	*name*	*gender*	*marks*
1	*Naman*	*M*	62
2	*Aliya*	*F*	70
3	*Aliya*	*F*	80
4	*James*	*M*	82
5	*Swati*	*F*	65

The SQL query below is executed on this database.

```
SELECT *
FROM Student
WHERE gender = 'F' AND
 marks > 65;
```

The number of rows returned by the query is _____

A. 0 **B. 1** **C. 2** **D. 3**

2.

Consider the relational database with the following four schemas and their respective instances.

Student(sNo, sName, dNo) Dept(dNo, dName)

Course(cNo, cName, dNo) Register(sNo, cNo)

Student		
sNo	sName	dNo
S01	James	D01
S02	Rocky	D01
S03	Jackson	D02
S04	Jane	D01
S05	Milli	D02

Dept	
dNo	dName
D01	CSE
D02	EEE

Course		
cNo	cName	dNo
C11	DS	D01
C12	OS	D01
C21	DE	D02
C22	PT	D02
C23	CV	D03

Register	
sNo	cNo
S01	C11
S01	C12
S02	C11
S03	C21
S03	C22
S03	C23
S04	C11
S04	C12
S05	C11
S05	C21

SQL Query:

```
SELECT * FROM Student AS S WHERE NOT EXIST
 (SELECT cNo FROM Course WHERE dNo = "D01"
    EXCEPT
  SELECT cNo FROM Register WHERE sNo = S.sNo)
```

The number of rows returned by the above SQL query is ___

A. 1 **B. 2** **C. 4** **D. 8**

3.

The relation scheme given below is used to store information about the employees of a company, where empId is the key and deptId indicates the department to which the employee is assigned. Each employee is assigned to exactly one department.

emp(empId, name, gender, salary, deptId)

Consider the following SQL query:

```
 select deptId, count(*)
from emp
where gender = "female" and salary > (select avg(salary)from emp)
group by deptId;
```

The above query gives, for each department in the company, the number of female employees whose salary is greater than the average salary of

A employees in the department

B employees in the company

C female employees in the department

D female employees in the company

4.

The SQL query

```
 SELECT columns
FROM TableA
RIGHT OUTER JOIN TableB
ON A.columnName = B.columnName
WHERE A.columnName IS NULL
```

returns the following:

A All rows in Table B, which meets equality condition above and, none from Table A which meets the condition.

B All rows in Table A, which meets equality condition above and none from Table B, which meets the condition.

C All rows in Table B, which meets the equality condition

D All rows in Table A, which meets the equality condition

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5.

Properties of 'DELETE' and 'TRUNCATE' commands indicate that

A. After the execution of 'TRUNCATE' operation, COMMIT, and ROLLBACK statements cannot be performed to retrieve the lost data, while 'DELETE' allow it

B. After the execution of 'DELETE' and 'TRUNCATE' operation retrieval is easily possible for the lost data

C. After the execution of 'DELETE' operation, COMMIT and ROLLBACK statements can be performed to retrieve the lost data, while TRUNCATE do not allow it

D. After the execution of 'DELETE' and 'TRUNCATE' operation no retrieval is possible for the lost data

6.

Consider a relational database containing the following schemas.

Catalogue

sno	pno	cost
S1	P1	150
S1	P2	50
S1	P3	100
S2	P4	200
S2	P5	250
S3	P1	250
S3	P2	150
S3	P5	300
S3	P4	250

Suppliers

sno	sname	location
S1	M/s Royal furniture	Delhi
S2	M/s Balaji furniture	Bangalore
S3	M/s Premium furniture	Chennai

Parts

pno	pname	part_spec
P1	Table	Wood
P2	Chair	Wood
P3	Table	Steel
P4	Almirah	Steel
P5	Almirah	Wood

The primary key of each table is indicated by underlining the constituent fields.

```
SELECT s.sno, s.sname
   FROM Suppliers s, Catalogue c
   WHERE s.sno=c.sno AND
       cost > (SELECT AVG (cost)
               FROM Catalogue
               WHERE pno = 'P4'
               GROUP BY pno) ;
```

The number of rows returned by the above SQL query is

A. 4 **B. 5** **C. 0** **D. 2**

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7.

A relational database contains two tables Student and Performance as shown below:

Student

Roll_no.	Student_name
1	Amit
2	Priya
3	Vinit
4	Rohan
5	Smita

Performance

Roll_no.	Subject_code	Marks
1	A	86
1	B	95
1	C	90
2	A	89
2	C	92
3	C	80

The primary key of the Student table is Roll_no. For the Performance table, the columns Roll_no. and Subject_code together from the primary key. Consider the SQL query given below:

```
SELECT S.Student_name, sum(P.Marks)
FROM Student S, Performance P
WHERE  P.Marks  >  84
GROUP BY S.Student_name;
```

The number of rows returned by the above SQL query is _____ .

A. 3 **B. 6** **C. 5** **D. 4**

8.

Consider the set of relations given below and the SQL query that follows:

```
 Students: (Roll_number, Name, Date_of_birth )

Coursed: (Course_number, Course_name, Instructor )

Grades: (Roll_number, Course_number, Grade)

SELECT DISTINCT Name

FROM Students, Courses, Grades

WHERE Students.Roll_number = Grades.Roll_number

                            AND   Courses.Intructor =Sriram

                            AND   Courses.Course_number = Grades.Course_number

                            AND   Grades.Grade = A
```

Which of the following sets is computed by the above query?

A. Names of Students who have got an A grade in all courses taught by Sriram

B. Names of Students who have got an A grade in all courses

C. Names of Students who have got an A grade in at least one of the courses taught by Sriram

D. None of the above

9.

Given relations R(w,x) and S(y,z), the result of
SELECT DISTINCT w,x
FROM R,S
is guaranteed to be same as R, if

A. R has no duplicates and S is non-empty

B. R and S have no duplicates

C. S has no duplicates and R is non-empty

D. R and S have the same number of tuples

10.

Consider the following two tables and four queries in SQL.

Book (isbn, bname), Stock (isbn, copies)

Query 1:
```
SELECT B.isbn, S.copies
FROM Book B INNER JOIN Stock S
ON B.isbn = S.isbn;
```

Query 2:
```
SELECT B.isbn, S.copies
FROM Book B LEFT OUTER JOIN Stock S
ON B.isbn = S.isbn;
```

Query 3:
```
SELECT B.isbn, S.copies
 FROM Book B RIGHT OUTER JOIN Stock S
 ON B.isbn = S.isbn;
```

Query 4:
```
SELECT B.isbn, S.copies
FROM Book B FULL OUTER JOIN Stock S
ON B.isbn = S.isbn;
```

Which one of the queries above is certain to have an output that is a superset of the outputs of the other three queries?

A. Query 1 **B. Query 2** **C. Query 3** **D. Query 4**

11.

Employee	Department	OT allowance
RAMA	Mechanical	5000
GOPI	Electrical	2000
SINDHU	Computer	4000
MAHESH	Civil	1500

What is the output of the following SQL query?

```
select count(*) from
   ((select Employee, Department from Overtime_allowance)
   natural join
   (select Department, OT_allowance from Overtime_allowance)
   as T);
```

A. 16 **B. 4** **C. 8** **D. None of the above**

12.

top _scorer.

Player	Country	Goals
Klose	Germany	16
Ronald	Brazil	15
G Muller	Germany	14
Fontaine	France	13
Pele	Brazil	12
Klinsmann	Germany	11
Kocsis	Hungary	11
Batistuta	Argentina	10
Cubillas	Peru	10
Lato	Poland	10
Lineker	England	10
T Miller	Germany	10
Rahn	Germany	10

Consider the following SQL query:

```
SELECT ta.player FROM top _scorer AS ta
WHERE ta.goals > ALL (SELECT tb. goals
                      FROM top _ scorer AS tb
                      WHERE tb.country = 'Spain')
AND ta.goals > ANY ( SELECT tc. goals
                     FROM top_ scorer AS tc
                     WHERE tc.country = 'Germany')
```

The number of tuples returned by the above SQL query is _____.

A. 5 **B. 6** **C. 7** **D. 8**

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13.

Consider a database that has the relation schema EMP (EmpId, EmpName, and DeptName). An instance of the schema EMP and a SQL query on it are given below.

EMP		
EmpId	EmpName	DeptName
1	XYA	AA
2	XYB	AA
3	XYC	AA
4	XYD	AA
5	XYE	AB
6	XYF	AB
7	XYG	AB
8	XYH	AC
9	XYI	AC
10	XYJ	AC
11	XYK	AD
12	XYL	AD
13	XYM	AE

```
SELECT AVG(EC.Num)
FROM EC
WHERE (DeptName, Num) IN
      (SELECT DeptName, COUNT(EmpId) AS
                                EC(DeptName, Num)
       FROM EMP
       GROUP BY DeptName)
```

The output of executing the SQL query is ____.

A. 1.3 **B. 6.5** **C. 2.6** **D. 5**

14.

The relation book (title,price) contains the titles and prices of different books. Assuming that no two books have the same price, what does the following SQL query list?

```
 select title
from book as B
where (select count(*)
    from book as T
    where T.price>B.price) < 5
```

A. Titles of the four most expensive books

B. Title of the fifth most inexpensive book

C. Title of the fifth most expensive book

D. Titles of the five most expensive books

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15.

water_schemes

scheme_no	district_name	capacity
1	Ajmer	20
1	Bikaner	10
2	Bikaner	10
3	Bikaner	20
1	Churu	10
2	Churu	20
1	Dungargarh	10

The number of tuples returned by the following SQL query is _____.

```
with total(name, capacity) as
    select district_name, sum(capacity)
    from water_schemes
    group by district_name
with total_avg(capacity) as
    select avg(capacity)
    from total
select name
    from total, total_avg
    where total.capacity ≥ total_avg.capacity
```

A. 1 **B. 2** **C. 3** **D. 4**

16.

Consider the following schema:
Emp (Empcode, Name, Sex, Salary, Deptt)
A simple SQL query is executed as follows:

```
 SELECT Deptt FROM Emp

GROUP by Dept

Having avg (Salary) > {select avg (Salary) from Emp}
```

The output will be

A. Average salary of male employee is the average salary of the organization

B. Average salary of male employee is less than the average salary of the organization

C. Average salary of male employee is equal to the average salary of the organization

D. Average salary of male employee is more than the average salary of the organization

17.

Consider the following relational query on the above database:

```
 SELECT S.name FROM Suppliers S
Where S.sid NOT IN (SELECT C.sid FROM Catalog C
WHERE C.pid NOT IN (SELECT P.pid FROM Parts P WHERE P.color <>'blue'))
```

A. Find the names of all suppliers who have supplied non-blue part.

B. Find the names of all suppliers who have not supplied non-blue part.

C. Find the names of all suppliers who have supplied only non-blue parts

D. Find the names of all suppliers who have not supplied only non-blue part.

18.

Consider the following relation

Cinema(theater, address, capacity)

Which of the following options will be needed at the end of the SQL query

SELECT P1.address FROM Cinema P1

such that it always finds the addresses of theaters with maximum capacity?

A. WHERE P1.capacity $\geq$ All (select P2.capacity from Cinema P2)

B. WHERE P1.capacity $\geq$ Any (select P2.capacity from Cinema P2)

C. WHERE P1.capacity $>$ All (select max(P2.capacity) from Cinema P2)

D. WHERE P1.capacity $>$ Any (select max(P2.capacity) from Cinema P2)

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19.

Student

Roll_No	Student_Name
1	Raj
2	Rohit
3	Raj

Performance

Roll_No	Course	Marks
1	Math	80
1	English	70
2	Math	75
3	English	80
2	Physics	65
3	Math	80

Consider the following SQL query.

```
SELECT S.Student_Name, sum(P.Marks)
FROM Student S, Performance P
WHERE S.Roll_No = P.Roll_No
GROUP BY S.Student Name
```

The number of rows that will be returned by the SQL query is _____.

A. 2 **B. 3** **C. 4** **D. 5**

20.

SELECT operation in SQL is equivalent to

A. the selection operation in relational algebra

B. the selection operation in relational algebra, except that SELECT in SQL retains duplicates

C. the projection operation in relational algebra

D. the projection operation in relational algebra, except that SELECT in SQL retains duplicates

21.

Consider the following relational schema:
Employee (empId, empName, empDept)
Customer (custId,custName, salesRepId, rating)
SalesRepId is a foreign key referring to empId of the employee relation. Assume that each employee makes a sale to at least one customer. What does the following query return?

```
SELECT empName
FROM employee E
 WHERE NOT EXISTS (SELECT custId
FROM customer C
WHERE C. salesRepId = E. empId
AND C. rating < > 'GOOD')
```

A. Names of all the employees with at least one of their customers having a 'GOOD' rating

B. Names of all the employees with at most one of their customers having a 'GOOD' rating.

C. Names of all the employees with none of their customers having a 'GOOD' rating.

D. Names of all the employees with all their customers having a 'GOOD' rating.

22.

SQL allows duplicate tuples in relations, and correspondingly defines the multiplicity of tuples in the result of joins. Which one of the following queries always gives the same answer as the nested query shown below:
Select * from R where a in (select S. a from S)

A. Select R. * from R, S where R. a=S. a

B. Select distinct R. * from R,S where R. a=S. a

C. Select R. * from R, (select distinct a from S) as S1 where R. a=S1.a

D. Select R. * from R, S where R.a = S. a and is unique R

23.

Given the following schema:
employees(emp-id, first-name, last-name, hire-date, dept-id, salary)
departments(dept-id, dept-name, manager-id, location-id)
You want to display the last names and hire dates of all latest hires in their respective departments in the location ID 1700. You issue the following query:

```
 SQL>SELECT last-name, hire-date
FROM employees
WHERE (dept-id, hire-date) IN
(SELECT dept-id, MAx(hire-date)
FROM employees JOIN departments USING(dept-id)
WHERE location-id = 1700
GROUP BY dept-id);
```

What is the outcome?

A. It executes but does not give the correct result

B. It executes and gives the correct result.

C. It generates an error because of pairwise comparison.

D. It generates an error because the GROUP BY clause cannot be used with table joins in a sub-query

24.

Given the following statements:
S1: A foreign key declaration can always be replaced by an equivalent check assertion in SQL
S2: Given the table R(a,b,c) where a and b together form the primary key, the following is a valid table definition.
CREATE TABLE S (
a INTEGER,
d INTEGER,
e INTEGER,
PRIMARY KEY (d),
FOREIGN KEY (a) references R)
Which one of the following statements is CORRECT?

A. S1 is TRUE and S2 is a FALSE
B. Both S1 and S2 are TRUE
C. S1 is FALSE and S2 is a TRUE
D. Both S1 and S2 are FALSE

25.

Consider the following relational schema:
Suppliers (sid:integer, sname:string, saddress:string)
Parts (pid:integer, pname:string, pcolor:string)
Catalog (sid:integer, pid:integer, pcost:real)
What is the result of the following query?

```
 (SELECT Catalog.pid from Suppliers, Catalog
WHERE Suppliers.sid = Catalog.sid)
MINUS
(SELECT Catalog.pid from Suppliers, Catalog
WHERE Suppliers.sname <> 'Sachin' and Suppliers.sid = Catalog.sid)
```

A. Pid of parts supplied by all except Sachin
B. Pid of parts supplied only by Sachin
C. Pid of parts available in catalog supplied by Sachin
D. Pid of parts available in catalog supplied by all except Sachin

26.

Students(rollno: integer, sname: string)

Courses(courseno: integer, cname: string)

Registration(rollno: integer, courseno; integer, percent: real)

Which of the following queries are equivalent to this query in English?

"Find the distinct names of all students who score more than 90% in the course numbered 107"

(I) SELECT DISTINCT S.sname
FROM Students as S, Registration as R
WHERE R.rollno=S.rollno AND R.Courseno=107 AND R.percent>90

(II) $\Pi_{sname}\left(\sigma_{courseno=107} \wedge percent > 90(Registration \quad Students)\right)$

(III) $\{T \mid \exists S \in Students, \exists R \in Registration\ (S.rollno = R.rollno \wedge R.courseno = 107 \wedge R.percent > 90 \wedge T.sname = S.name)\}$

(IV) $\left\{< S_N > \mid \exists S_R \exists R_P\left(< S_R, S_N > \in Students \wedge < S_R, 107, R_P > \in Registration \wedge R_P > 90\right)\right\}$

A. I, II, III and IV

B. I, II and III only

C. I, II and IV only

D. II, III and IV only

27.

Consider the following relations A, B and C:

A

Id	Name	Age
12	Arun	60
15	Shreya	24
99	Rohit	11

B

Id	Name	Age
15	Shreya	24
25	Hari	40
98	Rohit	20
99	Rohit	11

C

Id	Phone	Area
10	2200	02
99	2100	01

How many tuples does the result of the following SQL query contain?

```
 SELECT A.Id
FROM A
WHERE A.Age > ALL (SELECT B.Age
FROM B
WHERE B.Name = 'Arun')
```

A. 4 **B. 3** **C. 0** **D. 1**

28.

Which of the following statements are TRUE about an SQL query?

P : An SQL query can contain a HAVING clause even if it does not have a GROUP BY clause

Q : An SQL query can contain a HAVING clause only if it has a GROUP BY clause

R : All attributes used in the GROUP BY clause must appear in the SELECT clause

S : Not all attributes used in the GROUP BY clause need to appear in the SELECT clause

A. P and R

B. P and S

C. Q and R

D. Q and S

29.

Database table by name Loan_Records is given below.

Borrower	Bank_Manager	Loan_Amount
Ramesh	Sunderajan	10000.00
Suresh	Ramgopal	5000.00
Mahesh	Sunderajan	7000.00

What is the output of the following SQL query?

```
SELECT count(*)
FROM(
(SELECT Borrower. Bank_Manager FROM Loan_Records) AS S
NATURAL JOIN
(SELECT Bank_Manager, Loan_Amount FROM Loan_Records) AS T);
```

A. 3 **B. 9** **C. 5** **D. 6**

30.

Passenger (pid, pname, age)

Re servation (pid, cass, tid)

Table : Passenger

pid	'pname	Age
0	'Sachin'	65
1	'Rahul'	66
2	'Sourav'	67
3	'Anil'	69

Table : Re servation

pid	class	tid
0	'AC'	8200
1	'AC'	8201
2	'SC'	8201
5	'AC'	8203
1	'SC'	8204
3	'AC'	8202

What pids are returned by the following SQL query for the above instance of the tables?

```
 SELECT pid
FROM Re servation
WHERE class 'AC' AND
     EXISTS (SELECT *
                      FROM Passenger
                      WHERE age > 65 AND
                      Passenger.pid Reservation.pid)
```

A 1,0

B 1,2

C 1,3

D 1,5