Database Management System: Assignment 2

Total Marks : 20

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Question 1

Consider two relations `StyleName` and `PrintStyle` as follows:

StyleName	
Element	Style
Flower	Floral
Square	Block

PrintStyle	
Element	Color
Square	Blue
Lines	Multi

An operation Θ between `StyleName` and `PrintStyle` will generate the following output:

Style_Print		
Element	Style	Color
Flower	Floral	NULL
Square	Block	Blue
NULL	Lines	Multi

Identify the operation Θ. *Marks: 2* **MCQ**

a) natural join

b) natural left outer join

c) natural right outer join

d) natural full outer join

Answer: d)
Explanation: For natural join, none of the tuples 1 and 3 would not be present in the output. For left or right outer join, one of the tuples 1 and 3 would not be present in the output. Only in full outer join all 3 tuples will be present in the output.
Hence, option d) is correct.

Question 2

Consider the following `CREATE` statements: *Marks: 2* **MCQ**

```
CREATE TABLE faculty(
    faculty_id INT PRIMARY KEY,
    faculty_name VARCHAR(50) NOT NULL,
);

CREATE TABLE course(
    course_id INT PRIMARY KEY,
    faculty_id INT NOT NULL,
    course_fees INT,
    FOREIGN KEY (faculty_id)
    REFERENCES faculty (faculty_id)
    ON DELETE RESTRICT
);
```

Identify the correct statement(s) from the following options.

a) If a `faculty_id` value is deleted from the `faculty` table, the corresponding records in the `course` table that use this `faculty_id` will not be deleted.

b) If a `faculty_id` value is deleted from the `faculty` table, the corresponding records in the `course` table that use this `faculty_id` will also be deleted.

c) If a faculty_id value is deleted from the `faculty` table, the foreign key constraint will become invalid.

d) If a `faculty_id` value is deleted from the `faculty` table, the corresponding records in the `course` table that use this `faculty_id` will be deleted and the foreign key constraint will become invalid.

Answer: a)
Explanation: `ON DELETE RESTRICT` clause deletes the corresponding records in the parent table only. Hence, option (a) is correct.

Question 3

Consider the following schema:

- `loan(loan_number, branch_name, amount)`

Identify the correct option(s) in the following to delete all rows from `loan` table.

Marks: 2 **MSQ**

a) `DELETE * FROM loan;`

b) `DELETE FROM loan;`

c) `DROP TABLE loan;`

d) `TRUNCATE TABLE loan;`

Answer: b), d)

Explanation: To delete all rows from a table we can use either `DELETE` or `TRUNCATE` command and the syntax for these commands are:

```
DELETE FROM table name
[WHERE conditions];
```

Here, the condition is optional and another one is:

```
TRUNCATE TABLE table name;
```

So, options b) and d) are correct.

Question 4

Consider the following instance of the relation
BIDDINGTAB(PRODUCTID, HIGHESTBID, LOWESTBID, WINNER, BIDDERS)

PRODUCTID	HIGHESTBID	LOWESTBID	WINNER	BIDDERS
1EXP03	50000	2000	Chris L.	10
13HP05	45000	10000	Amara D.	50
S0W125	80000	1000	Lewis F.H	25
S0W128	80000	300	Lewis F.H	12
1EXP02	25000	100	John L.	7

Howe many tuples will be returned by the following SQL Query?

```
SELECT WINNER
FROM BIDDINGTAB
WHERE HIGHESTBID<=(
   SELECT AVG(HIGHESTBID)
   FROM BIDDINGTAB)
AND WINNER LIKE ' L.'
```

Marks: 2 **MCQ**

a) 0

b) 2

c) 3

d) 5

Answer: a)
Explanation: The average of HIGHESTBID from the given instance is 56000. Thus, SELECT WINNER FROM BIDDINGTAB WHERE HIGHESTBID<=(SELECT AVG(HIGHESTBID) FROM BIDDINGTAB) results in 3 tuples

WINNER
Chris L.
Amara D.
John L.

. However, none of the WINNER's name is ' L.'. Thus the intersection of the two conditions in the query produces 0 tuples. Hence, option (a) is correct.

Question 5

Consider the following instance of the relation
BIDDINGTAB(PRODUCTID, HIGHESTBID, LOWESTBID, WINNER, BIDDERS)

PRODUCTID	HIGHESTBID	LOWESTBID	WINNER	BIDDERS
1EXP03	50000	2000	Chris L.	10
13HP05	45000	10000	Amara D.	50
S0W125	80000	1000	Lewis F.H	25
S0W128	80000	300	Lewis F.H	12
1EXP02	25000	100	John L.	7

If the following SQL Query is executed, which of the following options will be true?

```
SELECT MAX(BIDDERS), WINNER
FROM BIDDINGTAB
GROUP BY HIGHESTBID, WINNER
ORDER BY WINNER DESC;
```

Marks: 2 **MCQ**

a) <50, Amara D.> will be the first tuple in the output.

b) <25, Lewis F.H> will be the first tuple in the output.

c) <12, Lewis F.H> will be the first tuple in the output.

d) <12, Lewis F.H> will be the last tuple in the output.

Answer: b)
Explanation: Based on the given SQL Query, the following will be the output

MAX(BIDDERS)	WINNER
25	Lewis F.H
7	John L.
10	Chris L.
50	Amara D.

Hence, option (b) is the correct option.

Question 6

Consider the following instance of the relational schema PAYSCALE(POSITION, BASE_SALARY, EXPERIENCE)

POSITION	BASE_SALARY	EXPERIENCE
MANAGER	75000	1
MANAGER	90000	5
CLERK	35000	5
DEVELOPER	50000	3
DEVELOPER	70000	5
SCIENTIST	90000	2

Which POSITION will NOT be present in the output generated by the following SQL Query?

```
SELECT DISTINCT(POSITION)
FROM PAYSCALE
WHERE BASE_SALARY<SOME(
   SELECT AVG(BASE_SALARY)
   FROM PAYSCALE
   GROUP BY EXPERIENCE);
```

Marks: 2 **MCQ**

a) CLERK

b) DEVELOPER

c) SCIENTIST

d) MANAGER

Answer: c)
Explanation: As per the syntax and semantics of SQL Queries. Refer to Week 2, slide 8.11. Hence, option (c) is correct.

Question 7

A role `Manager` has the privilege to perform select, insert, update and delete operations on all tables of database. A new role `Software_Engineer` is created and the following statement is executed.

```
grant Manager to Software_Engineer;
```

Which rights will `Software_Engineer` inherit? *Marks: 2* **MCQ**

a) Only select

b) Only select and delete.

c) Only select, and update but not delete.

d) All rights - select, delete, update.

Answer: d)
Explanation: All the privileges of the role of `Manager` transferred to `Software_Engineer`.

Question 8

Consider the following instance of `MountainDetails(MountainName,Altitude,StateName)` relation. *Marks: 2* **MCQ**

MountainDetails		
MountainName	Altitude	StateName
Kangchenjunga	8586	Sikkim
Nanda Devi	7816	Uttarakhand
Trisul	7120	Uttarakhand
Kamet	7756	Uttarakhand
Sandakfu	3636	West Bengal
Saltoro Kangri	7742	Jammu and Kashmir
Reo Purgyill	7742	Himachal Pradesh

Identify the correct statement(s) to get the following output:

MountainDetails		
MountainName	Altitude	StateName
Kangchenjunga	8586	Sikkim
Nanda Devi	7816	Uttarakhand
Trisul	7120	Uttarakhand
Kamet	7756	Uttarakhand

a)
```
SELECT * FROM MountainDetails
WHERE StateName IN('Sikkim','Uttarakhand');
```

b)
```
SELECT * FROM MountainDetails
WHERE StateName TO('Sikkim','Uttarakhand');
```

c)
```
SELECT * FROM MountainDetails
WHERE StateName AS('Sikkim','Uttarakhand');
```

d)
```
SELECT * FROM MountainDetails
WHERE StateName TO('Sikkim','Uttarakhand') OR Altitude>=7120;
```

Answer: a)
Explanation: Output table containing tuples whose `StateName` is either Sikkim or Uttarakhand. The IN operator allows to specify multiple values in a WHERE clause
Hence, option a) is correct.

Question 9

Consider the given relational schema: `MountainDetails(MountainName, Altitude, StateName)`

Marks: 2 **MCQ**

Identify the correct SQL command that updates the Altitude by 5% for all records whose `StateName` ends with character 'd'.

a)
```
UPDATE MountainDetails
OF Altitude=Altitude*1.05
WHERE StateName LIKE '%d';
```

b)
```
UPDATE MountainDetails
SET Altitude=Altitude*1.05
WHERE StateName LIKE '%d';
```

c)
```
UPDATE MountainDetails
AS Altitude=Altitude*1.05
FROM MountainDetails
WHERE StateName LIKE '%d';
```

d)
```
UPDATE MountainDetails
SET Altitude=Altitude*1.05
WHERE StateName LIKE '%d%';
```

Answer: b)
Explanation: As per SQL syntax, `LIKE '%d'` matches `StateName` having last character as 'd'. The percent sign represents zero, one, or multiple characters.
The underscore sign (_) represents one, single character.
General syntax for upadte statement is:

```
UPDATE Tablename
SET column1 = value1, column2 = value2, ...
WHERE condition;
```

Hence, option b) is correct.

Question 10

Consider the given relational schema: `MountainDetails(MountainName, Altitude, StateName)`

Marks: 2 **MCQ**

Identify the correct statement to find the `MountainName, Altitude` whose `Altitude` is greater than or equal to the average Altitude of all Mountains or Altitude in between 6500 and 8000.

a)
```
SELECT MountainName, Altitude
FROM MountainDetails
WHERE Altitude>=(SELECT AVG(Altitude) from MountainDetails)
OR Altitude LIKE(6500, 8000);
```

b)
```
SELECT MountainName, Altitude
FROM MountainDetails
WHERE Altitude>=(SELECT AVG(Altitude) from MountainDetails)
OR Altitude IN(6500, 8000);
```

c)
```
SELECT MountainName, Altitude
FROM MountainDetails
WHERE Altitude>=(SELECT AVG(Altitude) from MountainDetails)
OR Altitude BETWEEN 6500 AND 8000;
```

d)
```
SELECT MountainName, Altitude
FROM MountainDetails
WHERE Altitude>=(SELECT AVG(Altitude) from MountainDetails)
OR Altitude AS(6500, 8000);
```

Answer: c)
Explanation: The `BETWEEN` operator selects values within a given range. The values can be numbers, text, or dates and begin and end values are included. AVG(Altitude) is used to calculate average altitude of all mountains
Hence, option c) is correct.