Databases | Practical Exam III

I. Let R be a table in a SQL Server database with schema R[FK1, FK2, C1, C2, C3, C4]. The primary key is {FK1, FK2}. Answer questions 1-3 using the legal instance below. Each question has at least one correct answer.

FK1	FK2	C1	C2	C3	C4
1	3	Martha Delacruz	Ferrari	23.5	400
3	1	Roman Hayes	Mercedes	13.25	100
1	1	Maddison Rios	Haas	61.25	10
3	5	Haylee Hodges	Red Bull	50.5	300
5	1	Thalia Kemp	Mercedes	23.75	150
2	7	Marlie Jordan	Alfa Romeo	18.5	230
2	3	Lea Hill	AlphaTauri	2.75	520
2	1	Cason Barry	Ferrari	90.25	920
3	2	Skylar Velez	Red Bull	72.75	850
3	6	Dallas Lynch	Alfa Romeo	90.5	720
1	2	Jimena Mayer	Haas	80.25	640
1	7	Zayden Daugherty	Mercedes	95.75	450
2	5	Tate Huang	Ferrari	10.5	510
4	2	Rex Serrano	Alfa Romeo	15.25	320
2	4	Wilson Duke	AlphaTauri	30.25	290
5	2	Enrique Park	Haas	85.25	180

0.5 **1. Consider query Q below:**

```
SELECT C2, SUM(C3) AS S, COUNT(*) AS C
FROM R
WHERE C1 LIKE '%as%' OR C3 > 20
GROUP BY C2
HAVING SUM(C3) <= 150 OR COUNT(*) > 3
```

a. Q returns 6 records and value Mercedes is in its result set.
b. Q returns 5 records and value Red Bull is in its result set.
c. Q returns 6 records and value Haas is in its result set.
d. Q returns 5 records and value Haas is not in its result set.
e. None of the above answers is correct.

2. **How many records does the following query return?**

```
SELECT * FROM
 (SELECT * FROM R
  WHERE FK1 <= FK2)R1
RIGHT JOIN
 (SELECT * FROM R
  WHERE C4 / 10 < C3)R2
ON R1.FK1 = R2.FK1 AND R1.FK2 = R2.FK2
```

a. 10
b. 8
c. 9
d. 0
e. None of the above answers is correct.

3. **Table R has a single trigger defined on it:**

```
CREATE OR ALTER TRIGGER TriggerOnUpdate
    ON R
    FOR UPDATE
AS
    DECLARE @n INT = 0
    SELECT @n = SUM(2 * d.FK1 + i.FK2)
    FROM deleted d
    INNER JOIN inserted i
    ON d.FK1 = i.FK1 AND d.FK2 = i.FK2
    WHERE d.C3 > i.C3
    PRINT @n
```

What is the value returned by the PRINT statement in the trigger when the UPDATE below is executed?

UPDATE R

SET C3 = 35.5

WHERE FK2 > FK1

a. 38
b. 36
c. 24
d. 28
e. None of the above answers is correct.

II. Create a database for a system that manages flights. The entities of interest to the problem domain are: *Airplanes, Flights, Passengers, Reservations* and *Payments*. Each airplane has a model number, a registration number, and the capacity representing the number of passengers it can take. Registration numbers are unique. Each airplane flight has a flight number, a departure airport, a destination airport, a departure date and time, and an arrival date and time. Flight numbers are unique. Each flight is carried out by a single airplane. Each passenger has a first name, a last name, and an email address. Email addresses are unique. A passenger can book any number of flights, while a flight can be booked by any number of passengers. For each reservation the system must store the passenger, the flight and payment details. Each payment has an amount, date and time of the payment and type (card or cash). A reservation can have only one payment attached.

1. Write an SQL script that creates the corresponding relational data model.

2. Implement a stored procedure that receives the details of a payment and field(s) that identify an existing reservation and adds the payment to the corresponding reservation. If a payment for the reservation already exists, the system will display an error message and it will not update the reservation in the database.

3. Create a view that shows the names of the passengers that have at least one reservation for flights that depart from Madrid airport.

4. Implement a function that lists the flights with more than X valid reservations (a reservation is valid if there is a payment associated to it) during a period of time, where the period of time (start time, end time) and X are function parameters.