Roll No. _____ Name _____ Section ____

National University of Computer and Emerging Sciences, Lahore Campus

Course:	**Database Systems**	**Course Code:**	**CS219**
Program:	**BS(Computer Science)**	**Semester:**	**Fall 2020**
Duration:	**90 Minutes**	**Total Marks:**	**35**
Paper Date:	**Mon 19-Oct-2020**	**Weight**	**15%**
Section:	**ALL**	**Page(s):**	**4**
Exam:	**Midterm-1**	**Total Questions:**	**7**

Instruction/Notes: Scratch sheet can be used for rough work however, all the questions and steps are to be shown on question paper. ***No extra/rough sheets should be submitted with question paper.***
You will not get any credit if you do not show proper working, reasoning and steps as asked in question statements.

Consider the following patient database:

PATIENT

PatID	Pname	Category
100	Isbah	Adult
200	Izaan	Child
300	Tahreem	Child
400	Izaan	Adult
500	Tahreem	Adult

MEDICALCASE

CaseID	*PatID*	InjuryDate
1	100	2020-05-15
2	200	2020-05-20
3	100	2020-10-13
4	100	2020-10-16
5	100	2020-10-19

CLAIM

CaseID	Amount	Type
1	10000	InPatient
3	30000	Emergency

NOTE: In the above schema PKs are underline and *patID* in medicalcase table and *caseID* in claim table are Foreign Keys.

Q1. *(5 points)* **Give the Output** of the following query for the Database State given above.

```
SELECT P.patID, P.Pname, P.category
FROM patient AS P LEFT OUTER JOIN medicalcase AS M ON P.patID=M.patID
WHERE P.category != 'Child' AND M.caseID IS NULL
```

Q2. *(5 points)* **Give the Output** of the following query for the Database State given above.

```
SELECT P.patID, P.Pname, COUNT(M.caseID) AS TotalCases
FROM patient AS P JOIN medicalcase AS M ON P.patID=M.patID JOIN claim C ON M.caseID=C.caseID
GROUP BY P.patID, P.Pname
```

Roll No. _____ Name _____ Section ____

Q3. *(5 points)* Write a **SQL Query** to list down the name of all the patients that have claimed the medical cases above 15000 amount.

Q4. *(5 points)* Write a **SQL Query** to find pair of patients with the same name. Your query should print the PatIDs of the Patients with the same Name and the Pname. For the given database state, the output of this query would be

PatID-1	PatID-2	Pname
200	400	Izaan
300	500	Tahreem

Roll No. _____ Name _____ Section ____

Q5. *(10 points)* Apply following operations on the above patient database. State if the operation would be carried out successfully or not. In case of successful operation indicate the changes that will be made to the above database. Also state all the integrity constraints violated by each operation, if any. Please note that all operations are independent. Assume referential integrity constraint(RIC) on both FKs *patID* in medicalcase table and *caseID* in claim table are On Delete SET NULL and On Update CASCADE.

a. DELETE FROM medicalcase WHERE injuryDate > '2020-10-13';

Accept ○ **Explain:**

Reject ○

b. DELETE FROM patient WHERE category = 'Child';

Accept ○ **Explain:**
Reject ○

c. UPDATE claim SET caseID = 10 WHERE type = 'InPatient';

Accept ○ **Explain:**
Reject ○

d. INSERT INTO medicalcase VALUES (6, 300, '2020-10-29', 12000);

Accept ○ **Explain:**

Reject ○

e. INSERT INTO medicalcase VALUES (7, null, null);

Accept ○ **Explain:**
Reject ○

Roll No. _____ Name _____ Section ____

Q6. *(3 points)* Consider the following current state of the R relation.

R

A	B	C	D
a4	b1	c2	d1
a2	b2	c1	d1
a2	b2	c4	d2
a1	b4	c3	d1

Specify all possible candidate keys (i.e. minimal superkeys) for this current state of relation. You may assume that no future instances of this relation will violate the keys that can be inferred to hold in the current state.

Q7. *(2 points)* Give example of controlled data redundancy and data inconsistency.