

Roll No. _____ Name _____ Section _____

National University of Computer and Emerging Sciences, Lahore Campus



Course Name:	Database Systems	Course Code:	CS2005
Degree Program:	BS(Computer Science)	Semester:	Fall 2021
Exam Duration:	60 Minutes	Total Marks:	35
Paper Date:	Mon 18-Oct-2021	Weight	15%
Section:	ALL	Page(s):	5
Exam Type:	Midterm-1	Total Questions:	4

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.

Q1. (9 points) Given the following relational state, show the result of each SQL statement.

T1		T2	
<u>A</u>	<u>B</u>	<u>B</u>	
1	4	3	
2	4	4	
3	4	5	
1	5		
2	5		

- SELECT T1.B AS Bvalue, COUNT(A) AS Frequency FROM T1 JOIN T2 ON T1.B=T2.B GROUP BY T1.B;
- SELECT * FROM T2 LEFT OUTER JOIN T1 ON T1.B=T2.B WHERE T1.A != 1;
- (SELECT A FROM T1 UNION SELECT B FROM T2 EXCEPT SELECT B FROM T1)
INTERSECT
SELECT B FROM T2;

A

<u>Bvalue</u>	<u>Frequency</u>
4	3
5	2

B

<u>A</u>	<u>B</u>	<u>B</u>
2	4	4
3	4	4
2	5	5

C

<u>A</u>
3

Q2. (6 points) Consider the following relational database. The column 'RollNo' in grade table is a foreign key (from student table) and referential integrity constraint is on Delete/Update cascade. The column 'CourseCode' in grade table is also a foreign key (from course table) and referential integrity constraint is on Delete/Update no action.

STUDENT

RollNo	Name	Login	Age	GPA
1500	Tahreem	tahreem@cs	18	3.3
1550	Isbah	isbah@cs	19	3.1
1600	Izaan	izaan@ee	17	2.6
1650	Isbah	isbah@ee	19	3.6
1700	Alia	alia@math	18	3.3

GRADE

RollNo	Course Code	Letter Grade
1500	CS2005	A
1500	CS1002	B
1550	CS1002	A
1550	CS2001	C

COURSE

Course Code	Title	CrHrs
CS1002	CP	4
CS2001	DS	4
CS2005	DB	4
CS2006	OS	4

Apply following operations on the above 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.**

- INSERT INTO grade VALUES (1500, 'CS1002', NULL);
Successful, one row inserted
- DELETE FROM course WHERE Title='OS';
Successful, one row deleted
- DELETE FROM student WHERE gpa=3.1;
Successful, 3 rows deleted
- DELETE FROM grade WHERE grade='A';
Successful, 2 rows deleted
- UPDATE student SET rollno=1234 WHERE gpa=3.1;
Successful, 3 rows updated
- UPDATE course SET coursecode='CS204' WHERE title='DB';
Failed, reference integrity issue

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Q3. (5 points) Write SQL statement to create the *GRADE* table given above in Question#2. Also specify primary key constraint on RollNo & CourseCode columns, foreign key constraint on RollNo column, foreign key constraint on CourseCode column, and CHECK constraint on LetterGrade column that ensures that LetterGrade is in (A, B, C, D, F).

```
CREATE TABLE grade (  
  
    rollno INTEGER ,  
    coursecode text,  
    lettergrade text,  
  
    constraint prim PRIMARY key (rollno, coursecode),  
  
    constraint rollfk foreign KEY (rollno) references Student(rollno) on delete cascade on update cascade,  
    constraint checkGr check (lettergrade in ('A', 'B', 'C', 'D', 'F')),  
  
    constraint coursefk foreign KEY (coursecode) references course (coursecode)  
);
```

Q4. (15 points) Consider the following relations for a database that keeps track of business trips of salespersons in a sales office. The primary keys are underlined. The column *CNIC* in trip table is a foreign key (from salesperson table) and the column *Trip-ID* in expense table is also a foreign key (from trip table).

SALESPERSON (CNIC, Name, Start-Year, Dept-No)

TRIP (*CNIC*, From-City, To-City, Departure-Date, Return-Date, Trip-ID)

EXPENSE (Trip-ID, Account#, Amount)

Write the SQL statement for the following:

- a. Retrieve the name of salespersons who took trips to 'Islamabad'.
- b. Retrieve the name of salespersons who took no trip.
- c. Retrieve the cnic of salespersons who took more than 5 trips.

A: select salesperson.name from salesperson join trip on salesperson.cnid = trip.cnid where trip.tocity = 'isb';

B: select salesperson.name from salesperson left outer join trip on salesperson.cnid = trip.cnid where trip.tocity is null;

C: select salesperson.cnid as B from salesperson join trip on salesperson.cnid = trip.cnid group by B having (count(B) > 5);

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