Department of Computer Science
University of Delhi
MCSE 204: Database Applications (CIA-I)

Time: 1 hour | June 15, 2021 | Maximum Marks: 15

1. How many possible ways a primary key can be formed for a relation with five attributes (say, V, W, X, Y, and Z)? [1]

2. Consider relations $R(A, B, C)$ and $S(B, D, E)$ and a functional dependencies set $F = \{B \rightarrow A, A \rightarrow C\}$ that holds over these relations. The relation R contains 200 tuples and the relation S contains 100 tuples. What is the maximum number of tuples possible in the R *natural join* S). [1]

3. The following table has two attributes *Attribute1* and *Attribute2* where Attribute1 is the primary key and Attribute2 is the foreign key referencing Attribute1 with on-delete cascade. [2]

Attribute1	Attribute2
A	C
B	C
C	B
D	A
F	A
G	D
E	C

   List out all the tuples that must be additionally deleted to preserve referential integrity when the tuple (A,C) is deleted.

4. Given relations $X(a, b)$ and $Y(c, d)$ in the database, provide a condition when the result of SQL query given below will be same as X. [2]

$$select\ distinct\ a,\ b\ from\ X,\ Y$$

5. Consider a relation schema Sells(Book_Store, Book_Name, Price), where each row represents the price paid for a book at a particular book store. Assume that the primary key of Sells is (Book_Store, Book_Name). Consider (independently) each of the following SQL INSERT statements which generates an error when executed. In each case, give the (possible) cause(s) of the error. [2]

   (a) $INSERT\ INTO\ Sells\ (Book\_Store)\ values('India\ Book\ Centre')$

   (b) $INSERT\ INTO\ Sells\ values\ ('India\ Book\ Centre',\ 'And\ Then\ There\ Were\ None',\ 0.0)$

6. Consider the Student database schema given below [3]

```
CREATE TABLE Student (
StudentId int PRIMARY KEY,
Stud_Name varchar NOT NULL);

CREATE TABLE Course (
CourseId char(7) PRIMARY KEY,
Cour_Name varchar NOT NULL,
NoOfPts int NOT NULL);

CREATE TABLE Enrolled (
StudentId int NOT NULL REFERENCES Student,
CourseId char(7) NOT NULL REFERENCES Course,
Grade char(2),
PRIMARY KEY (StudentId, CourseId));

CREATE TABLE Stud_Sport (
StudentId int NOT NULL REFERENCES Student,
Sport_Name varchar NOT NULL,
PRIMARY KEY (StudentId, Sport_Name));
```

What will be output of the following SQL statement.

```
SELECT s.StudentId, Stud_Name
FROM Student s
WHERE NOT EXISTS
((SELECT e.StudentId
  FROM Enrolled e
  WHERE s.Studentid = e.StudentId)
EXCEPT
(SELECT p.StudentId
  FROM Stud_Sport p
  WHERE Sport_Name = 'Squash' AND s.Studentid = p.StudentId));
```

NOTE: Assume **EXCEPT** is supported.

7. Consider a relational schema $R(P, Q, R, S, T, U, V)$ and the following functional dependencies that holds on R. List all candidate keys. [4]

   $P \rightarrow S$, $PT \rightarrow V$, $SU \rightarrow QR$, $T \rightarrow R$, $V \rightarrow T$