

Department of Computer Science
University of Delhi
MCAC 202: Database Systems (CIA-I)

Time: 1 hour

June 24, 2021

Maximum Marks: 15

1. Consider the schema $R(A, B, C, D, E)$ and a set $F = \{AB \rightarrow CDE, CD \rightarrow ABE, E \rightarrow D\}$ of functional dependencies that holds over R . State which normal form the relation R is in. [1.5]
2. Consider schema $R(P, Q, R, S, T)$ and a set $F = \{P \rightarrow QR, RS \rightarrow T, Q \rightarrow S, T \rightarrow P\}$ of functional dependencies that holds over R . Let the schema R is decomposed into $R1(P, Q, R)$ and $R2(P, S, T)$. State whether the decomposition is lossless or lossy. [2.5]
3. Draw an ER diagram for the Indian Premier League (IPL): [6]
 - IPL has many teams and each team there are many players
 - Each team has a *name*, a *city*, a *coach*, a *captain*, and a *set of players*
 - Each player belongs to only one team
 - Each player has a name, a batting position (such as *top order*, *middle order* or *tail enders*), a role (*batsman*, *bowler* or *Allrounder*), and a set of injury records
 - A team captain is also a player
 - A game is played between two teams (referred to as *host_team* and *guest_team*) and has a date.
 - The performance of each player has to be recorded, i.e., the *number of wickets* and *runs scored*.
4. Consider the relation $A(\underline{SSN}, Name, Age, Gender)$ given below. [5]

SSN	Name	Age	Gender
001	Arun	60	M
002	Shreya	24	F
003	Rohit	11	M
004	Hari	40	M
005	Geeta	30	F
006	Ram	34	M
007	Arun	35	M
008	Anjali	30	F
009	Ritu	35	F
010	Arun	50	M

Provide the output of the following SQL queries. **Justify your answer in case if query return error.**

- (a) `SELECT A.SSN
FROM A
WHERE A.Age >= ALL(SELECT B.Age
FROM A as B
WHERE B.Name = "arun")`

- (b) *SELECT A.SSN*
FROM A
WHERE A.Age > Some(SELECT B.Age
FROM A as B
WHERE B.Name = "arun")
- (c) *SELECT A.SSN*
FROM A
WHERE A.Age > (SELECT B.Age
FROM A as B
WHERE B.Name = "Amit")
- (d) *SELECT A.SSN*
FROM A
WHERE exists(SELECT B.Age
FROM A as B
WHERE A.age > B.age)
- (e) *SELECT A.SSN*
FROM A
WHERE A.Age > (SELECT B.Age
FROM A as B
WHERE B.Name like "A%")