JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATIONS-2023

B.Tech-III Semester (CSE &IT)

COURSE CODE (CREDITS): 18B11CI313(3)   MAX. MARKS: 15

COURSE NAME: DATABASE MANAGEMENT SYSTEMS   MAX. TIME: 1 Hour

COURSE INSTRUCTORS: Prof. P.K. Gupta, Dr. Pardeep Kumar, Dr. Ekta Gandotra, Dr. Amit Kumar, Dr. Nishant Sharma

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Note: (a) All questions are compulsory.

(b)Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

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Q1. What are mapping constraints in a database, and why are they important in the design and maintenance of a relational database system?   **[CO1] [2]**

Q2. Discuss primary key and its importance in relational database. Differentiate between candidate key and super key using an example to illustrate answer?   **[CO1] [2]**

Q3. Assume we have the following application that models soccer teams, the games they play, and the players in each team. In the design, we want to capture the following: **[CO3] [3]**

- We have a set of teams, each team has an ID (unique identifier), name, main stadium, and to which city this team belongs.
- Each team has many players, and each player belongs to one team. Each player has a number (unique identifier), name, DoB, start year, and shirt number that he uses.
- Teams play matches, in each match there is a host team and a guest team. The match takes place in the stadium of the host team.
- For each match we need to keep track of the following:
  ➤ The date on which the game is played
  ➤ The final result of the match
  ➤ The players participated in the match. For each player, how many goals he scored, whether or not he took yellow card, and whether or not he took red card.
  ➤ During the match, one player may substitute another player. We want to capture this substitution and the time at which it took place.
- Each match has exactly three referees. For each referee we have an ID (unique identifier), name, DoB, years of experience. One referee is the main referee and the other two are assistant referee.

Design an ER diagram to capture the above requirements. List your assumptions and clearly indicate the cardinality mappings.

Q4. Consider the following given schema   [CO2] [4]

Suppliers(sID, sName, address)
Parts(pID, pName, colour)
Catalog(sID, pID, price)

Where:
Catalog[sID] ⊆ Suppliers[sID]
Catalog[pID] ⊆ Parts[pID]

Write the relational algebra expression for following given queries:

a) Find the names of all red parts.
b) Find all prices for parts that are red or green. (A part may have different prices from different manufacturers.)
c) Find the sIDs of all suppliers who supply a part that is red or green.
d) Find the names of all suppliers who supply a part that is red or green.

Q5. Consider the following given relations R and S: [CO2] [2]

R					S		
A	B	C	D		B	D	E
α	1	α	a		1	a	α
β	2	γ	a		3	a	β
γ	4	β	b		1	a	γ
α	1	γ	a		2	b	δ
δ	2	β	b		3	b	τ

Find the value of R ⋈ S.

Q6. Convert the following given entity set into relational schema(s):   [CO3] [2]