B. TECH. (COMPUTER SCIENCE & BUSINESS SYSTEMS) (CBCS - 2018 COURSE)

Computer Science & Business Systems

**B.Tech. (CSBS) Sem - IV :SUMMER : 2023**

**SUBJECT : DATABASE MANAGEMENT SYSTEMS**

Day : Saturday | Time : 10:00 AM-01:00 PM

Date : 27-05-2023 | **S-20453-2023** | Max. Marks : 60

**N. B. :**

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable calculator is **ALLOWED**.
4) Draw neat and labelled diagrams **WHEREVER** necessary.
5) Assume suitable data, if necessary.

**Q. 1** Draw an ER diagram for cafeteria database. Support the diagram with assumptions considered for the database. List all types of attributes that can be used in ER diagram and appropriately identify and use them in the drawn diagram. **(10)**

**OR**

Compare the relational model with entity based model. Elaborate the elements used for representing a relational model. **(10)**

**Q. 2** Consider following schemas for relational database for employees **(10)**

Employee(person_name, street, city)

Works (person_name, company_name, salary)

Company (company_name, city)

Assume that these tables are already created but no integrity constraints are included. Write SQL queries for following tasks:

a) Write A SQL Query to enforce suitable referential integrity

b) Write SQL queries to insert at least one row in each table

c) Modify employee table to add column age

d) Delete company name 'Synerzy' of Pune city

**OR**

Enlist the additional relational algebra operations. Compare the Cartesian product and natural join operation of relational algebra with suitable examples. **(10)**

**Q. 3** Clarify the significance of functional dependency in relational database design with an example. State the Armstrong's axioms and describe those in detail. **(10)**

**OR**

Why is Boyce – Codd Normal Form (BCNF) a desirable normal form than its predecessor normal forms? How does it eliminate all redundancy that can be discovered based on functional dependencies? Demonstrate with an example. **(10)**

**P. T. O.**

Q. 4 Consider any two relational schemes and elaborate any two algorithms for computing the joins of these relations. Also analyse their respective costs. **(10)**

**OR**

What is query optimization? Which statistics about database relations are stored in database system catalogs? How are these catalogs used to estimate statistics on result of a selection operation? **(10)**

Q. 5 Why single phase locking protocol is more prone to deadlock or starvation? Elaborate the two phase locking protocol in detail and justify that it overcomes the drawbacks of single phase locking protocol. **(10)**

**OR**

Which properties of transactions are maintained to ensure integrity of data? Explain the transactions state model in detail. **(10)**

Q. 6 What is the difference between authentication and authorization? Discuss any two access control models that can be used for securing the contents of databases. **(10)**

**OR**

Name the process of "semi-automatically analysing large databases to find useful pattern". Elaborate this process in detail with the significance of classification technique used therein. **(10)**

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