

DATABASE SYSTEM CONCEPTS AND PL / SQL

BRANCH:- CSE

SEMESTER – THIRD

These important questions have been prepared using your previous exam papers (PYQs), verified concepts, and additional reference from trusted online academic sources. For deeper understanding, please refer to your class notes as well.

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I. Database Fundamentals and Design (DBMS & ER Model)

1. **DBMS Architecture:** Explain the purpose of a DBMS. Discuss and illustrate the different types of **DBMS Architectures** (specifically two-tier and three-tier/client-Server) with neat diagrams and their respective advantages.
2. **ER Modeling & Mapping:**
 - Describe the **Entity-Relationship (ER) model**. Explain the classification of entities and relationships, and differentiate between the various types of **Attributes** (Simple, Composite, Derived, Multi-valued).
 - Explain the process of **translating an ER diagram to a Relational Model**, ensuring all constraints are verified.
3. **DBA and Data Views:** Explain the **roles and responsibilities of a Database Administrator (DBA)**. Differentiate between the **view of data** at the physical, conceptual, and external (view) levels.
4. **Constraints and Integrity:** Define a **Relational Model**. Explain the various **Constraints** in a relational model, focusing on the concepts of **Entity Integrity** and **Referential Integrity** with examples.

II. Normalization and Design Refinement (Core DBMS)

These questions cover the crucial normalization unit (Week 4), which guarantees a long, high-scoring answer.

5. **Normalization Process:** Define **Normalization**. Explain the need and importance of normalization in database design. Discuss the concept of **Design Anomalies** (Insertion, Deletion, Update) with suitable examples.
 6. **Normal Forms and Comparison:** Explain and differentiate clearly between the **First Normal Form (1NF)**, **Second Normal Form (2NF)**, and **Third Normal Form (3NF)** with examples.
 7. **Functional Dependency:** Define **Functional Dependency**. Discuss its importance and explain the rules/properties associated with it.
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III. Structured Query Language (SQL)

8. **SQL Commands:** Explain the different types of **Database Languages (DDL, DML, DCL, TCL)**. Provide the syntax and examples for DDL commands (**CREATE, ALTER, DROP**) and DML commands (**INSERT, UPDATE, DELETE**).
 9. **JOIN Operations:** What is the necessity of **JOIN operations**? Explain the working and syntax of **INNER JOIN, LEFT JOIN, and RIGHT JOIN** with a clear example for each.
 10. **Aggregation and Grouping:** Discuss the purpose of **Aggregate Functions** (COUNT, SUM, AVG, MIN, MAX). Explain their use along with the **GROUP BY** and **HAVING** clauses in generating reports.
 11. **Subqueries:** Explain the concept of a **Subquery**. Differentiate between **Single-Row and Multiple-Row Subqueries**. Write an example of a query using a **Correlated Subquery** or the EXISTS/NOT EXISTS operator.
 12. **Views and Access Control:** What is a **View**? Write the SQL commands to **create, drop, and update a view**. Explain how **Data Control Language (DCL) commands** are used to manage user access and privileges.
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IV. Transaction Management and PL/SQL

13. **Transaction Properties:** Explain the **ACID properties (Atomicity, Consistency, Isolation, Durability)** of a transaction and their critical role in ensuring database reliability.
14. **Transaction Control:** Explain the use of **Transaction Control Commands** (**COMMIT, ROLLBACK, and SAVEPOINT**) in managing the state of data modification.

15. **PL/SQL Programming:**

- Explain the basic **structure of a PL/SQL block**. Describe the use of variables, datatypes, and control statements (decision making) in PL/SQL.
- Explain the concept, syntax, and structure of **Stored Procedures and Functions** in PL/SQL. What is the difference between them?

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