

SAMPLE PAPERS
DIPLOMA THIRD SEMESTER EXAMINATION 2025 (JUT)
DATABASE MANAGEMENT SYSTEM CONCEPTS AND PL/SQL
DIPLOMA WALLAH

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Full Marks: 70 | **Time:** 3 Hours

Instructions: * Answer **five** questions in total.

- **Question No. 1** is compulsory.
- Answer any **four** questions from the remaining (Q2 to Q7).
- All questions carry equal marks.

Q1. Choose the correct alternative of the following: (2 × 7 = 14 Marks)

(i) Which level of data abstraction describes how data is actually stored in the database?

- (a) Physical Level
- (b) Logical Level
- (c) View Level
- (d) Conceptual Level

(ii) In the Relational Model, a row in a table is also known as a:

- (a) Attribute
- (b) Tuple
- (c) Domain
- (d) Relation

(iii) Which SQL clause is used to filter the results of a GROUP BY function?

- (a) WHERE
- (b) ORDER BY
- (c) HAVING
- (d) DISTINCT

(iv) A variable that can hold the memory address of another variable is known as (in context of PL/SQL Cursors/Pointers concept):

- (a) Rowtype
- (b) Pointer
- (c) Ref Cursor
- (d) Trigger

(v) Which symbol is used to represent a "Weak Entity" in an ER Diagram?

- (a) Double Rectangle
 - (b) Dashed Ellipse
 - (c) Double Diamond
 - (d) Rectangle with rounded corners
- (vi) The command TRUNCATE TABLE belongs to which category of SQL?
- (a) DML
 - (b) DDL
 - (c) DCL
 - (d) TCL
- (vii) Which property of a transaction ensures that all operations are completed successfully, or none are?
- (a) Consistency
 - (b) Isolation
 - (c) Atomicity
 - (d) Durability
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Q2. (7 + 7 = 14 Marks)

- (a) Explain the purpose of a DBMS. Discuss and illustrate the different types of DBMS Architectures (specifically two-tier and three-tier) with neat diagrams.
- (b) Describe the Entity-Relationship (ER) model. Explain the classification of entities and relationships, and differentiate between the various types of Attributes.

Q3. (7 + 7 = 14 Marks)

- (a) Define a Relational Model. Explain the various Constraints in a relational model, focusing on the concepts of Entity Integrity and Referential Integrity with examples.
- (b) Explain the process of translating an ER diagram to a Relational Model, ensuring all constraints are verified.

Q4. (7 + 7 = 14 Marks)

- (a) Define Normalization. Explain the need and importance of normalization in database design. Discuss the concept of Design Anomalies (Insertion, Deletion, Update).
- (b) Explain and differentiate clearly between the First Normal Form (1NF), Second Normal Form (2NF), and Third Normal Form (3NF) with examples.

Q5. (7 + 7 = 14 Marks)

- (a) 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.
- (b) Explain the different types of Database Languages (DDL, DML, DCL, TCL). Provide syntax and examples for DDL and DML commands.

Q6. (7 + 7 = 14 Marks)

- (a) Explain the ACID properties of a transaction and their critical role in ensuring database reliability.
- (b) Explain the basic structure of a PL/SQL block. Describe the use of variables, datatypes, and control statements in PL/SQL.

Q7. Write short notes on any four: (3.5 × 4 = 14 Marks)

- (a) Database Administrator (DBA) Roles
- (b) Functional Dependency
- (c) Aggregate Functions
- (d) Views in SQL
- (e) COMMIT and ROLLBACK



SOLUTIONS FOR PAPER 1

MCQ Answer Key:

(i) (a) Physical Level

(ii) (b) Tuple

(iii) (c) HAVING

(iv) (c) Ref Cursor (or generally pointers in programming, though specifically Ref Cursor in PL/SQL context)

(v) (a) Double Rectangle

(vi) (b) DDL

(vii) (c) Atomicity

Short Answer Hints (Q7):

- **(a) DBA:** Responsible for schema design, security, access control, and backup/recovery.
- **(b) Functional Dependency:** Relationship where attribute A uniquely determines attribute B ($A \rightarrow B$).
- **(c) Aggregate Functions:** Perform calculations on multiple rows to return a single value (SUM, AVG, COUNT).
- **(d) Views:** Virtual tables based on the result-set of an SQL statement; do not store data physically.
- **(e) COMMIT/ROLLBACK:** TCL commands; Commit saves changes permanently, Rollback undoes changes to the last savepoint.

Model Long Answer (Q6a - ACID):

- **Atomicity:** "All or nothing" rule. The transaction happens completely or not at all.
- **Consistency:** Database remains in a valid state before and after the transaction (satisfying constraints).
- **Isolation:** Multiple transactions occurring at the same time do not impact each other's intermediate states.
- **Durability:** Once committed, changes are permanent even in case of system failure.