

(2 ½ Hours)

[Total Marks:75]

N.B: (1) All questions are compulsory.

(2) Figures to the right indicate marks.

(3) Illustrations, in-depth answers and diagrams will be appreciated.

(4) Mixing of sub-questions is not allowed.

Q1. **Attempt the following (any THREE):** (15)

- (A) What is functional Dependency? State the need and importance of functional dependency.
- (B) Briefly explain what will happen, if lossless-join decomposition will not be implemented in relational database system while implementing normalization.
- (C) Define following
Fourth Normal Form.
Fifth Normal Form.
- (D) What is Transaction? Explain different states of Transaction with diagram.
- (E) Define Serial schedule. Define Non-serial schedule. State the features of both.
- (F) What is precedence graph? What is the purpose of precedence graph? Draw a precedence graph for schedule S, where $S = r_1(x) r_3(y) w_1(x) w_2(y) r_3(x) w_2(x)$

Q2. Attempt the following (any THREE): **(15)**

- (A) What is lock? Explain 2 phase locking in detail.
- (B) What is deadlock? State the ways to deal with deadlock.
- (C) Explain ARIES algorithm in brief.
- (D) What are the entries made in log file? Explain in detail importance and need of log file.
- (E) Describe in brief Write-ahead log protocol.
- (F) Write a short note on Thomas Write rule.

Q3. Attempt the following (any THREE): (15)

- (A) What is package? State and explain advantages of using packages in PL/SQL.
- (B) Write in brief: PL/SQL Source Code Using the Data Dictionary
- (C) Differentiate between static and dynamic SQL.
- (D) Create a package containing a function taking integer value as parameter which calculates salary of an employee by multiplying the integer value by 6 and inserting into employee table.
- (E) Explain in brief working of DBMS_SQL package.
- (F) Illustrate the use of Native Dynamic SQL using the EXECUTE IMMEDIATE Statement

Q4. Attempt the following (any THREE): (15)

- (A) Explain need of Triggers in database. Focus the area of the applications of Triggers.
- (B) What is Instead of Trigger? Explain it with example.
- (C) State and explain syntax of Creating Triggers of different types.
- (D) Explain hash based Indexing in detail.
- (E) What is Heap file? Explain the cost model of Heap file for accessing and storing data in Heap file.
- (F) What is Indexing? Write a syntax of creating and dropping Indexes.

Q5. Attempt the following (any THREE): (15)

- (A) Write a short note on View serializability.
- (B) Describe in brief transaction and dirty page table entries which are useful in recovery.
- (C) What is curser? What is curser variable?
- (D) State the difference between primary and secondary Indexing.
- (E) Explain in brief Redo and Undo phases.
- (F) What is Statement level Trigger? Explain the scenarios where statement level triggers are useful.
