21CS53 SIMP Questions

Prepared by the CS/IS-TIE review team

Module-1

1. With a neat diagram, explain three schema architectures.
2. List and explain the characteristics, advantages of the DBMS approach.
3. Explain the following: a) DBMS b) Database c) Database Schema d) Weak Entity Type e) Participation Constraint f) Cardinality ratio g) Recursive relationship h) Specialization i) DBMS catalog j) Snapshot.
4. Develop an ER diagram for various databases [Company, University, Airlines], considering at least 5 entities.
5. Explain different types of user-friendly interfaces and types of users who typically use each.
6. Explain component modules of DBMS and their interaction.

Module-2

1. Study SQL queries for different databases. * (vvimp)
2. Mention all the steps involved in conversion of ER constructs to corresponding relational tables.
3. Explain all the SQL commands with syntax and examples.
4. Briefly explain the various Data Types and Domains in SQL.
5. What are the relational algebra operations in Set Theory? Briefly explain them with examples.
6. Write a note on Relational Model Constraints in SQL.
7. What are the characteristics of Relations?

Module-3

1. Explain the concept of views and joins in SQL with an example.
2. Draw and explain 3-tier Architecture and technology relevant to each tier. Mention its advantages.
3. What is SQLJ? How it is different from JDBC. Write a short note on Drivers in JDBC (8+4)
4. Explain Cursors in Embedded SQL.Differentiate between Dynamic and Embedded SQL
5. Write a note on Specifying Constraints as Assertions in SQL. Also explain how assertions and triggers are defined with an example.
6. What are stored procedures in SQL? Elaborate.
7. Write notes on: i) CGI ii) HTML forms iii) Java Scripts iv) Servlets v) Application Servers
8. **Solve query related questions**

Module-4

1. Explain insertion, deletion & modification anomalies. Why are they considered bad? Illustrate with an

example.

2. Write the algorithm to find the minimal cover for a set of FD's.
3. Given below are two sets of FD's for a relation R(A,B,C,D,E).Are they equivalent?
4. Define non-additive join property of a decomposition and write an algorithm for testing of non-additive join property.
5. Explain 1NF,2NF,3NF & BCNF with examples. What is needed for normalization?
6. What are the informal design guidelines for relational schema design?
7. Define functional dependency. Explain the various inference rules for functional dependencies with proof.

Module-5

8. List and explain ACID Properties
9. With a neat state transition diagram, explain the states involved in transaction execution.
10. With an example, explain ARIES Recovery Algorithm.
11. Briefly explain Transaction Support in SQL
12. With an example, explain basic Timestamp Ordering algorithm and two-phase locking protocol used in concurrency control. How does it guarantee serializability?
13. Write short notes for the following: i) transaction rollback and cascading rollback. ii) transaction support in SQL iii) shadow paging iv) No UNDO/REDO recovery based on deferred update. v) Recovery based on Immediate Update - out of syllabus but study this
14. How does deadlock and starvation problems occur? Explain how these problems can be resolved.
15. Explain why concurrency control is required. Justify the need for recovery.

Practice these and more problems(M4)

Write an algorithm to check whether decomposed relations are in 3NF with dependency preservation and non – additive join property. Consider universal relation R = (U, C, L, A) and the set of functional dependencies. F = {P → LCA, LC → AP , A → C}. Decompose the relation R into 3NF with dependency preservation and non – additive join property.

1.

Consider the universal relation : R = {A, B, C, D, E, F, G, H, I, J} and the set of functional dependencies. F = {AB → C , A → DE , B → F , F → GH , D → IJ}.
Determine whether each decomposition has the loss less join property with respect to F.

2. $D_1 = \{R_1, R_2, R_3\}$; $R_1 = \{A, B, C, D, E\}$; $R_2 = \{B, F, G, H\}$; $R_3 = \{D, I, J\}$.

3. F={A->C,AC->D,E->AD,E->H} and G={A->CD,E->AH} . Consider R={A,B,C,D,E,F} .FD's {A->C,AC->D,E->AD,E->H} Find the irreducible cover for this set of FD's(minimal cover)