

B. TECH.**EIGHTH SEMESTER EXAMINATION, 2003–2004
ADVANCED CONCEPTS IN DATABASE SYSTEMS**

Time : 3 Hours

Total Marks : 100

LIBRARY

Jai Hind College Institute of Technology
GHAZIABAD**Note :** (1) Attempt **ALL** questions.

(2) All questions carry equal marks.

1. Attempt any **FOUR** parts of the following :—

- (a) What is meant by cost-based query optimization ? Discuss.
- (b) What is meant by the term, Heuristic Optimization ? Discuss the main heuristics, that are applied during query optimization.
- (c) Consider, the relations $r_1 (A, B, C)$, $r_2 (C, D, F)$ and $r_3 (E, F)$, with primary keys A , C , and E respectively. Assume that r_1 has 1000 tuples, r_2 has 1500 tuples and r_3 has 750 tuples. Estimate the size of r_1 , r_2 and r_3 , and give an efficient strategy for computing them.
- (d) Consider the following SQL query for a bank database :—

Select T. branch-name
from branch T, branch S

where T. assets, S. assets and S. branch-city="MUMBAI".

Write an efficient relational-algebra expression that is equivalent to this query. Justify your choice.

- (e) What is a Query Execution Plan ? Discuss.
- (f) What is meant by Semantic Query Optimization ? How does it differ from other query optimization techniques ?

2. Attempt any FOUR parts :—

- (a) Define the terms, Interpretation and Model with suitable examples.
- (b) What is the difference between Structured and Unstructured complex objects ?
- (c) What primary characteristics should an O/D possess ? Discuss with an example.
- (d) How does the concept of an object in the object-oriented model differ from the concept of an entity in the ER model ?
- (e) What is the difference between Persistent and Transient objects ? How is persistence handled in typical OO database system ?
- (f) What is meant by Expert Database system ? Discuss.

3. Attempt any TWO of the following :—

- (a) What are the main software modules of a DDBMS ? Discuss the main functions of each of these modules in the context of the client-server architecture.
- (b) How is a horizontal partitioning of a relation specified ? How can a relation be put back together from a complete horizontal partitioning ? Discuss.
- (c) Compare the primary site method with the primary copy method for distributed concurrency control. How does the use of back-up sites affect each ? Discuss.

4. Attempt any TWO of the following :—

- (a) What are Typical Security Classifications ? Discuss the simple security property and the *-property, and explain the justification behind these rules for enforcing multilevel security.

- (b) (i) What are Digital Signatures ? How do they work ?
- (ii) Give an example of an encryption algorithm and explain how it works.
- (c) (i) Discuss the role of DBA.
- (ii) How is the view mechanism used as an authorization mechanism ? Explain with example.

4. Attempt any TWO of the following :—

- (a) (i) How do spatial databases differ from regular databases ?
- (ii) What problems can occur in a continuous media system, if data is delivered either too slowly or too fast ? Explain.
- (b) (i) What are the five types of knowledge produced from data mining ? Explain.
- (ii) Discuss some applications of active databases.
- (c) Write short notes on any of *two* :—
 - (i) Advanced Transaction Model
 - (ii) Database Operating System
 - (iii) Deductive Databases