

Fourth Semester Examination, April - 2005

RELATIONAL DATABASE MANAGEMENT SYSTEMS

Full Marks : 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any five from the rest.

The figures in the right-hand margin indicate marks for the questions.

- I. Answer all questions : 2×10
- (a) Explain the following terms associated with relational database design: primary key, secondary key, foreign key.
  - (b) How can you map a conceptual model to a relational model ?
  - (c) Explain the following DML commands using appropriate examples: INSERT INTO, DELETE\_FROM, SELECT-FROM.
  - (d) What is a data warehouse ?
  - (e) Define Data Model. Mention the various categories of Data Model.

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- (f) Define Schema. Explain Schema Diagram with example.
- (g) What is Metadata? Mention the merits and demerits of Three-Schema Architecture.
- (h) Do database systems provide physical program-data independence? Explain why?
- (i) What is a data dictionary (also called a system catalogue)? Describe some of the information that it can contain. How is this information organised in a relational database? Give an example.
- (j) What is meant by Concurrency? Mention characteristics of Database Approach.
2. (a) What do you understand by a data model? Explain the difference between a conceptual data model and the internal model. 5
- (b) What are the main steps of database design? Explain them in brief. 5
3. (a) What is normalization? Explain the first and second normal forms using appropriate examples. 5
- (b) Explain the join and selection operations in an RDBMS. How can join operation be used to simulate a selection? 5

4. (a) Consider a database at a University which contains information on students (name, roll number, courses, marks, etc.), courses (Course title, contents, faculty, students taking this course, their grades, etc.), and faculty (name, employee number, salary, courses, etc). Draw an ER diagram to represent this database. 5
- (b) What do you understand by concurrency control in a database? Why is it needed? How is it achieved? 5
5. (a) What do you understand by lossless join? Explain using a suitable example. 5
- (b) What is an object-oriented database? What are its advantages compared to relational database? Explain some applications where an object-oriented database may be useful. 5
6. (a) What do you understand by functional dependency? Explain using a suitable example. 5
- (b) Explain the SQL construction for selections, projections, and joins. 5
7. (a) Explain the difference between relational algebra and relational calculus. 5
- (b) What is triple calculus? Define triple variables and well-formed formulas. 5

8. (a) What do you understand by OLAP ? How is it different compared to OLTP ? Explain the important OLAP operations. 5
- (b) What do you understand by query optimization ? How is it achieved ? 5

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