MCA 3rd Semester Examination, 2010

DBMS

PAPER—2301

Full Marks : 100

Time : 3 hours

Answer any **five** questions

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

1. (*a*) A University Registrar's office maintains data about the following entities : 10

   (*i*) Course, including number, title, credits, syllabus and prerequisites.

   (*ii*) Course offering, including course number, year, semester, section number, instructor(s), timings and classroom.

(*iii*) Students, including student_id, name and program.

(*iv*) Instructors including identification number, name, department and title. Construct an E-R diagram for the above. Document all assumptions that you make about the mapping constraints.

(*b*) Explain any three aggregate functions of SQL with an example of each. 4

2. (*a*) Illustrate the difference between hierarchical and network data models. Explain why relational data model is a better choice over the two. 6

(*b*) Explain the concepts of Generalization and Specialization with examples. 8

3. (*a*) What is a join ? How is it different from cartesian product in Relational Algebra ? Explain with example. 6

(*b*) What is a integrity constraints ? Explain with at least two example. 4

(*c*) State the difference between database schema and database instance. 4

4. (*a*) For the following relations for a book club :

Members (Member_id, Name, Designation, Age)

Books (Bid, Btitle, BAuthor, Bpublisher, Bprice)

Reserves (Member, Bid, Date)

where Bid is book identification, Btitle is book title, Bpublisher is book publisher and Bprice is book price. Use relational algebra to find following : 10

(*i*) Find the names of members who are professors older than 45 years.

(*ii*) List the titles of Books reserved by professors.

(*iii*) Find IDs of members who have not reserved books that cost more than Rs. 500.

(*iv*) Find the authors and titles of books reserved on 01-JAN-2010.

(*b*) How UML differs from E-R diagram ? Give example. 4

5. (*a*) What do you understand by transaction? What properties of transactions must be present to ensure data integrity? Briefly explain.

(*b*) What do you mean by functional dependency and partial functional dependency. Compute the closure of the following set F of functional dependencies for a relation schema $R = (A, B, C, D, E)$ $A \rightarrow BC$, $CD \rightarrow E$, $B \rightarrow D$ $E \rightarrow A$. List the candidate keys of R.

(*c*) What is trigger? Explain and give example.

6. (*a*) How many types of aggregate functions are? Explain in detail with example.

(*b*) Write down the basic structure of SQL expression.

(*c*) What do you mean by tuple relational calculus? Explain with example.

7. (*a*) State the difference between B tree and B + tree. 3

(*b*) What do you mean by clustering ? 2

(*c*) Explain two phase locking protocol in detail. 4

(*d*) Write down the different types of single level index. 5

[*Internal Assessment* – 30 Marks]