Code: CS33   **Subject: DATABASE MANAGEMENT SYSTEMS**

ALCCS – OLD SCHEME

Time: 3 Hours   **AUGUST 2013**   **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE
IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:
- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
- **Parts of a question should be answered at the same place.**

Q.1   a. Discuss the main characteristics of the database approach and how it differs from traditional file system.

   b. Discuss the main categories of data models.

   c. Can an identifying relationship of a weak entity type be of a degree greater than two? Discuss.

   d. What is the difference between logical data independence and physical data independence? Which one is harder to achieve? Why?

   e. Briefly discuss the different types of update operations on a relation.

   f. Weak entities do not have their own key attributes. Justify the statement.

   g. Explain ACID properties of transactions.   **(7×4)**

Q.2   a. Define foreign key. What is this concept used for?   **(6)**

   b. Discuss the entity integrity and referential integrity constraints.   Why is each considered important?   **(6)**

   c. Why are duplicate tuples not allowed in a relation?   **(6)**

Q.3   a. Consider the following relations:
      WORKS(Pname, Cname, Salary)
      LIVES(Pname, Street, City)
      LOCATED_IN(Cname, City)
      Manager(Pname, Mgrname)
      Where Pname = Person name, Cname = Company name and Mgrname = Manager name.
      Write the SQL queries for the following:

(i) List the names of the people who work for the company Wipro along with the cities they live in.

(ii) Find the names of the persons who live and work in the same city.

(iii) Find the names of the persons who do not work for 'Infosys'.

(iv) Find the persons whose salaries are more than that of all of the 'Oracle' employees.

(v) Find the names of the companies that are located in every city where the company 'Infosys' is located.   **(5×3)**

b. Explain the Inner Join concept in Relational Algebra.   **(3)**

Q.4   a. Explain Trivial Functional dependencies with example.   **(3)**

b. Explain Multivalued dependencies and also describe 4NF with appropriate example.   **(9)**

c. Give a Relation R(W,X,Y,Z) and functional dependencies are given as:
$$W \rightarrow Z$$
$$\{Y,Z\} \rightarrow X$$
$$\{W,Z\} \rightarrow Y$$
Find superkeys and candidate key.   **(6)**

Q.5   a. What is a lock? Describe the types of locks used in concurrency control?   **(6)**

b. Discuss the different types of transaction failures. What is meant by catastrophic failure?   **(6)**

c. What is two phase locking protocol? How does it guarantee serializability?   **(6)**

Q.6   a. Explain why the Undo Pass of recovery procedure is performed in the backward direction and Redo Pass is performed in the forward direction?   **(6)**

b. Explain Multi-version Time-stamp ordering protocol.   **(6)**

c. Discuss the main techniques for recovery from non-catastrophic transaction failure.   **(6)**

Q.7   Write Short notes on any **THREE** of the following:-

(i)   Emerging threats to database systems.
(ii) Advantages & Disadvantages of distributed DBMS.
(iii) Data cubes and their usages in data warehousing.
(iv) ROLAP and MOLAP.   **(6+6+6)**