ROLL NO. _____

Code: CT13 **Subject: DATABASE MANAGEMENT SYSTEMS**

ALCCS - NEW SCHEME

Time: 3 Hours **AUGUST 2012** **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. State four main advantages of using a DBMS.

b. What is the difference between procedural and non-procedural DMLs?

c. Differentiate between strong entity and weak entity set using a suitable example.

d. What is meant by a safe expression in Relational Calculus?

e. What are the basic data types available for attributes in SQL?

f. Discuss the problem of spurious tuples and how we may prevent it.

g. What do you understand by "View Equivalence"? State three conditions that must hold for two schedules to be equivalent. **(7 × 4)**

Q.2 Book club has members to whom the books are sold. The books are made available at different places in the city. The books are identified by a book_id, the author and the publisher. An author can write more than one book and a book can have more than one author. Members have information such as Memership_id, Name, Phone# and Status. A member can place more than one order. You can choose additional attributes for the schema that seem appropriate. Mention any assumption you make. Show minimum and maximum cardinality ratios based on your assumptions.

(i) Design an E-R schema diagram for this application. **(12)**

(ii) Map the E-R diagram into relational model. **(6)**

Q.3 a. How does SQL implement the entity integrity and referential integrity constraints of the relational data model? Explain with an example. **(6)**

b. What do you mean by view in SQL? Explain giving a suitable example, when

(i) a view with single defining table

(ii) views defined on multiple tables using joins

(iii) views defined using grouping, is/are updatable. **(6)**

c. What do you mean by JOIN? Explain various JOIN operations in Relational Algebra with example. **(6)**

Q.4 a. What are the Informal design guidelines for relational schema? Explain **(6)**

b. Describe Join Dependencies and 5NF, using suitable example(s). **(6)**

c. Given a Relation R(W,X,Y,Z) and the following set of functional dependencies:
$W \rightarrow Z$
$W \rightarrow Y$
$\{Y, Z\} \rightarrow X$
$\{W, Z\} \rightarrow Y$
Identify redundant functional dependencies. **(6)**

Q.5 a. Which of the following schedules is/are conflict serializable? For each serializable schedule, determine the equivalent serial schedule.
(i) $r_1(X); r_3(X); w_1(X); r_2(X); w_3(X)$
(ii) $r_1(X); r_3(X); w_3(X); w_1(X); r_2(X)$
(iii) $r_3(X); r_2(X); w_3(X); r_1(X); w_1(X)$ **(3×4)**

b. Explain ACID properties of transactions. **(6)**

Q.6 a. Explain the concepts of Horizontal Fragmentation and Vertical Fragmentation. **(6)**

b. Why do we require a two-level recovery mechanism for multidatabase transactions? Briefly describe two phases of two-phase commit protocol. **(6)**

c. Compare and contrast the following:
(i) Commit and Roll-back.
(ii) Redo and Undo. **(6)**

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

(i) Categories of Data models.
(ii) Using Heuristics in Query optimization.
(iii) Distributed Databases.
(iv) Web Databases. **(6×3)**