ROLL NO. _____

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

ALCCS - NEW SCHEME

Time: 3 Hours **FEBRUARY 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. What is data redundancy? What are the disadvantages of having redundancy within a database?

b. What is the difference between logical data independence and physical data independence?

c. List the various cases where use of a NULL value would be appropriate.

d. When is a query language called relationally complete?

e. What is the difference between WHERE and HAVING clause?

f. Why should NULLs in a relation be avoided as far as possible?

g. What are transaction commit points and why are they important? **(7 × 4)**

Q.2 A database is being constructed to keep track of the teams and games of a sport league. A team has a number of players, not all of whom participate in each game. It is desired to keep track of players participating in each game for each team, the positions they play in that game and the result of the game.

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

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

Choose your favourite sport (e.g. Soccer, Baseball or Football)

Q.3 a. In what sense does relational calculus differ from relational Algebra and in what sense they are similar. **(6)**

b. Discuss the meanings of the existential quantifiers $(\exists)$ and universal quantifier $(\forall)$. **(6)**

c. What is the difference between UPDATE and ALTER command in SQL. **(6)**

Q.4 a. Explain Multi-version Time-stamp ordering protocol. **(6)**

b. Explain the concept of conflict serializability. Define conflicting instructions and non-conflicting instructions. **(6)**

c. Given below are two sets of FDs for a relation R(A,B,C,D,E). Are they equivalent?
(i) $A \rightarrow B, AB \rightarrow C, D \rightarrow AC, D \rightarrow E$
(ii) $A \rightarrow BC, D \rightarrow AE$ **(6)**

Q.5 a. Consider the following relation:
CAR_SALE(Car#, Date_sold, Salesman#, Commission%, Discount_amt)
Assume that a car may be sold by multiple salesmen, and hence {Car#, Salesman#} is the primary key. Additional dependencies are
Date_sold $\rightarrow$ Discount_amt and
Salesman# $\rightarrow$ Commission%
Based on the given primary key, is this relation is 1NF, 2NF or 3NF? Why or why not? How would you successively normalize it completely? **(6)**

b. A set of FDs for the relation R{A, B, C, D, E, F} is AB $\rightarrow$ C, C $\rightarrow$ A, BC $\rightarrow$ D, ACD $\rightarrow$ B, BE $\rightarrow$ C, EC $\rightarrow$ FA, CF $\rightarrow$ BD, D $\rightarrow$ E. Find a minimum cover for this set of FDs. **(6)**

c. Explain multivalued dependencies and also describe 4NF with appropriate example. **(6)**

Q.6 a. What do you mean by transaction? What are the desirable properties of transactions? **(6)**

b. Explain incorrect summary problem with example. **(6)**

c. Explain two phase commit protocol. **(6)**

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

(i) Data Warehousing
(ii) Data Mining
(iii) Management of distributed data with different levels of transparency.
(iv) Cascading rollback **(6 × 3)**