2013

(May)

DBMS

Paper : EC 813

Full Marks : 100

Pass Marks : 30

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *a)* What is a functional dependency? Discuss the problems of spurious tuples and how we may prevent it. 3+7=10

   b) Discuss the purpose of Boyce-Codd normal form and describe how BCNF differs from and is stronger than 3NF. Illustrate your answer with an example. 10

2. *a)* Consider the following relation : 12

CAR-SALE (Car#, Date-sold, Salesman#, Commission%, Discount-amt). Assume that a car may be sold by multiple salesman, 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 in 1NF, 2NF or 3NF ? Why or why not ? How would you successively normalize it completely?

b) What is a participation role? When is it necesary to use role names in the description of relationship types? 3+5=8

3. *a)* Explain the following terms : 2×5=10

i) transaction

ii) granularity

iii) Concurrence

iv) dirty read and

v) ACID properties of transaction.

b) What is the two-phase locking protocol ? How does it guarantee serializability ? 4+6=10

4. *a)* Discuss the optimistic concurrency control technique. Name it's phases. How is minimum overhead reached? 10

b) What is the difference between logical data independence and physical data independence ? Which one is harder to achieve and why ? 7+3=10

5. *a)* What are the different types of database end users? Discuss the main activities of *each*. 3+7=10

b) Describe the three-schema architecture. Why do we need mapings between schema levels ? What is data redundancy ? 6+2+2=10

6. *a)* Discuss different types of ordered indexes. Write a brief note on B+ trees. 9+15=14

b) How does multi-level indexing improve the efficiency of searching an index file. 6

7. *a)* *i)* Discuss how NULL are treated in comparison operators in SQL. 4

ii) Write a SQL statement to retrieve the name and address of all employees who work for 'Research' department and who stay in 'Houston'. 2

iii) Write a SQL statement for each department, retrieve the department, the no. of employees in the department and their average salary. 2

Note : for Q. no 7(a) ii) & iii)* consider 'COMPANY' database.

iv) Write a single relational algebra expression to retrieve the first name, last name and salary of all employees who work in department no. 5. 2

b) What are the main goals of RAID ? 5

c) Write a short note on Hasping Techniques. 5
