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B. Tech

BCSE 3202

Fourth Semester Examination – 2008

RELATIONAL DATABASE
MANAGEMENT SYSTEMS

Full Marks – 70

Time – 3 Hours

Answer Question No. 1 which is compulsory
and any five from the rest.

The figures in the right-hand margin
indicate marks.

1. Define the following terms : 2×10
- (a) What is the difference between a primary key and a candidate key ?
 - (b) Let $R = (A, B, C, D)$ and functional dependencies (1) $A \rightarrow C$, (2) $AB \rightarrow D$. What is the closure of $\{A, B\}$?

P.T.O.

- (c) What do you mean by semi less join ?
- (d) Define super key and give example to illustrate the super key.
- (e) What are the two techniques to prevent deadlock ?
- (f) What do you mean by multi-valued dependency ?
- (g) Define and differentiate between Natural Join and Inner Join.
- (h) What is meant by Concurrency ?
- (i) Mention the various categories of Data Model.
- (j) Define : Entity Type, Entity Set and Value Set.

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Contd.

- 2. (a) What is normalization of relation ? What is a key attribute in a relation ? What is the difference between 1st Normal Form, 2nd normal form and 3rd normal form ?

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- (b) Define entity, attribute and relationships as used in relational databases. Describe purpose of E-R Model. Illustrate your answer with an example.

5

- 3. (a) Define the structure and properties of B Tree. Explain how the B tree is used as a index structure. Construct a B tree of order 3 with following key value : 10, 2, 30, 20, 86, 4, 6, 3, 60, 84, 88, 33, 52, 91, 69.

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(b) What are the major components of the relational model? What is simple relational database? What are two models in which you can use SQL? 5

4. (a) Explain difference between Implicit and Explicit locks. Give examples to support your answer. 5

(b) What is an object-oriented database? What are its advantages compared to relational database? Explain some applications where an object-oriented database may be useful. 5

5. (a) State Armstrong's axioms. Show that Armstrong's axioms are complete. 5

(b) Explain the difference between inner join and outer join. What are the restrictions on using outer join? Give examples to support your answer. 5

6. (a) What does the term *redundancy* mean? Discuss the implications of redundancy in a relational database. 5

(b) Define (i) Primary key, and (ii) Foreign key. Suppose relation $R(A,B,C,D,E)$ has functional dependencies:

$$AB \rightarrow C$$

$$D \rightarrow A$$

$$AE \rightarrow B$$

$$CD \rightarrow E$$

$$BE \rightarrow D$$

Find all the candidate keys of R . 5

7. (a) What is a distributed database management system ? How is it different to that of client server database systems ? 5

(b) Consider the following tables : 2

S		
A	B	C
3	7	9
8	6	5

R		
A	F	G
5	8	1
8	2	6

Show the semantics and the output of the following query :

```

SELECT *
FROM S, R
WHERE S.A = R.A AND S.B = R.G ;

```

(c) Define "Data mining". What are the supports must available with DBMS to facilitate data mining ? 3

8. (a) List out the six fundamental operators and 4 additional operators in relational algebra. 2.5

(b) Explain the two conditions needed for the set difference operation (union operation) to be valid. 2.5

(c) Construct a B+ tree of order 1 with following keys, 1, 9, 5, 3, 7, 11, 17, 13, 15 ? 2.5

(d) What is the use of outer join and list out the three types of outer join with the notations used in relational algebra ? 2.5