

Total number of printed pages – 7

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}** ?

- (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.

P.T.O.

BCSE 3202

2

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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 ?
5

(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.**
5

BCSE 3202 3 P.T.O.

(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 is 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

BCSE 3202 4 Contd.

(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

BCSE 3202

5

P.T.O.

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			R		
A	B	C	A	F	G
3	7	9	5	8	1
8	6	5	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

BCSE 3202

6

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- (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

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