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Roll No.

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B.Tech.(CSE) (2011 Onwards) (Sem.-5) RELATIONAL DATABASE MANAGEMENT SYSTEM-I Subject Code : BTCS-502 Paper ID : [A2098]

Time:3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

SECTION- A

- 1. Write Briefly :
 - a) How does multi-level indexing improve the efficiency of searching an index file?
 - b) A key is a group of one or more attributes that uniquely identifies a row. If true then how?
 - c) Explain the difference between BCNF and 3 NF.
 - d) Under what conditions must a foreign key not be null?
 - e) Does the relational model, provide physical and logical data independence?
 - f) How does the relational calculus differ from relational algebra?
 - g) What are the constraints on Specialization and Generalization?
 - h) What is the main strength of Relational Databases?
 - i) Differentiate shared mode and exclusive mode lock.
 - j) What is the role of the query system?

SECTION-B

2. Each semester, each student must be assigned an adviser who counsels students about degree requirements and helps students register for classes. Each student must register for classes with the help of an adviser, but if the student's assigned adviser is not available, the student may register with any adviser. We must keep track of students, the assigned adviser for each, and the name of the adviser with whom the student registered for the current term. Represent this situation of students and advisers with an E-R diagram. Also, draw a data model for this situation.

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- 3. a) Define multivalued dependency. What do you understand by trivial multivalued dependency?
 - b) What are the two integrity rules? Explain with examples how these rules are important to enforce consistent database states.
- 4. Explain the differences between user views, a conceptual schema, and an internal schema as different perspectives of the same database.
- 5. a) List three conditions that you can apply to determine whether a relation that is in first normal form is also in second normal form.
 - b) How do you represent a 1: *M* unary relationship in a relational data model?
- 6. Given R {ABCD} and a set F of functional dependencies on R given as

 $F = \{AB \rightarrow C, AB \rightarrow D, C \rightarrow A, D \rightarrow B\}.$

Find any two candidate keys of R. Show each step. In what normal form is R? Justify.

SECTION- C

- 7. a) Consider the relation schema R(P, Q, R, S, T) and the functional dependencies $PQ \rightarrow R, R \rightarrow S$ and $S \rightarrow T$ holding on R. Decompose the relation R, if necessary, into collections of relations that are in BCNF.
 - b) Briefly explain the deferred update technique of recovery. What are the advantages and disadvantages of this technique? Why is it called the NO-UNDO/REDO method?
- 8. Write short note on the following
 - a) Difference between relation algebra and relation calculus
 - b) Procedural and non- procedural query language
 - c) Precedence graphs to check serializability
 - d) DBA
- 9. Consider the following relations with underlined primary keys

 $\label{eq:product} Product(P_code, Description, Stocking_date, QtyOnHand, MinQty, Price, Discount, V_code)$

Vendor(V_code, Name, Address, Phone)

Here a vendor can supply more than one product but a product is supplied by only one vendor. Write SQL queries for the following :

- a) List the names of all the vendors who supply more than one product.
- b) List the details of the products whose prices exceed the average product price.
- c) List the Name, Address and Phone of the vendors who are currently not supplying any product.