

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
 $\text{Product}(\underline{P_code}, \text{Description}, \text{Stocking_date}, \text{QtyOnHand}, \text{MinQty}, \text{Price}, \text{Discount}, \text{V_code})$
 $\text{Vendor}(\underline{V_code}, \text{Name}, \text{Address}, \text{Phone})$
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.