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Roll No.

TCS-503

**B. TECH. (CSE/IT) (FIFTH SEMESTER)
END SEMESTER EXAMINATION, 2021-22
DATABASE MANAGEMENT SYSTEMS**

Time : Three Hours

Maximum Marks : 100

- Note :** (i) All questions are compulsory.
(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.
(iii) Total marks in each main question are **twenty**.
(iv) Each question carries 10 marks.

1. (a) What do you mean by the term Data Independence ? How many types of data independence are there ? Explain the concept by taking a practical example.

(CO1)

- (b) How many types of database users are there ? Explain the difference between Database Manager and Database Administrator.

(CO1)

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- (c) Explain Codd's rule. (CO1)
2. (a) Construct an E-R diagram for a car insurance company whose customers have one or more car each. Each car has associated with it zero or any number of recorded accidents. Each insurance policy covers one or more car and has one or more premium payments associated with it. Each payment is for a particular period of time and has an associated due date and the date when the payment was received. Make assumption if necessary. (CO2)
- (b) What do you mean by constraint ? Explain all the types of constraints with a suitable example. (CO2)
- (c) Explain the following terms : (CO2)
- (i) Structural Constraint
 - (ii) Types of Attribute
 - (iii) Cardinality of relationship
3. (a) What are the characteristics and basic structure of SQL ? (CO3)
- (b) Describe the need of join. Explain all the types of join through example. (CO3)

- (c) Explain all the aggregate functions available in SQL. (CO3)

4. (a) What problems are caused by data redundancies ? Can data redundancies be completely eliminated and when database approach is used ? Why or why not ? (CO4)

- (b) What is the need of normalization ? How many types of normalization are there ? Explain with their properties. Prove that the following relation is in 2NF but not in 3NF considering the given dependencies : (CO4)

R1 (A, B, C, D, E, F) and F = ($A \rightarrow B$, $A \rightarrow C$, $C \rightarrow D$, $D \rightarrow E$, $D \rightarrow F$)

- (c) What do you mean by relational algebra ? What are the operations of relational algebra ? Consider a relational Train (Train_no, Tname, Destination, Source, Journey_Hrs).

Write the relational algebra statements to answer the following queries : (CO4)

- (i) To find the number and names of all the trains.

- (ii) To find the details of the trains that start from Hyderabad.
 - (iii) To find all destinations, source and journey hours of train number '23344'.
 - (iv) To find all the train numbers whose source is "New Delhi" and destination is "Chennai".
 - (v) To display all the details of trains whose journey hours are more than 48.
5. (a) Explain the difference between serializable and conflicting schedule with a suitable example. (CO5)
- (b) Explain the transaction and transaction states. Explain ACID property through a suitable example. (CO5)
- (c) What do you mean by transaction and database failure ? Explain all the types of failure. (CO5)