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Total Number of Pages: 02

B. Tech
RCS5C002

5th Semester Regular / Back Examination: 2021-22

DATABASE MANAGEMENT SYSTEMS

Branch: CSE, CST, IT

Max Marks: 100

Time: 3 Hours

Q Code: OF258

Answer Question No.1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right-hand margin indicate marks.

Part- I

- Q1 Only Short Answer Type Questions (Answer All-10)** (02×10)
- a) What is metadata? Give an example? (2)
 - b) Differentiate between schema and instance? (2)
 - c) Explain how update command works in SQL? (2)
 - d) Explain briefly about the object-oriented data model? (2)
 - e) Define Foreign Key? Write an example to explain it. (2)
 - f) Explain the role of DBA in DBMS? (2)
 - g) Define a Transaction in database? (2)
 - h) Explain the dirty read problem? (2)
 - i) What is trivial functional dependency? (2)
 - j) Explain the use of hashing in Index structures? (2)

Part- II

- Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** (06×08)
- a) Explain the three-schema architecture of DBMS? (6)
 - b) Give an example of a weak entity set? Explain why it is weak with an ER diagram. (6)
 - c) What do you mean by the Integrity constraints? Explain each with the proper example? (6)
 - d) Explain the Armstrong's axioms for Functional dependencies? (6)
 - e) Given $R(A, B, C, D, E, F)$ with FDs
 $\{A \rightarrow C, B \rightarrow E, AB \rightarrow C, C \rightarrow D, E \rightarrow F\}$.
Normalize R up to BCNF. (6)
 - f) What is multivalued functional dependency? Explain 4NF with example. (6)
 - g) In SQL which command is used for table creation? Also write the SQL command for creating a table with proper constraints. (6)
 - h) What are the deadlock and starvation problems in database in concurrent transactions? (6)
 - i) Define different states of a Transaction with proper diagram? (6)
 - j) Explain the ACID property of a Transaction in detail. (6)
 - k) Explain the multi-level indexing and B⁺ Tree? (6)
 - l) What is the use of Index in database management system? Explain the primary and secondary Indexing with proper diagram? (6)

Part-III

- Only Long Answer Type Questions (Answer Any Two out of Four)** (02×16)
- Q3** Consider the following relation $R(A,B,C,D,E,F)$ with a set of functional dependencies: (16)
 $FD = \{ A \rightarrow BC, B \rightarrow CD, D \rightarrow EF, BC \rightarrow AG, ABG \rightarrow DF \}$
- a) Find the closure of each determinant.
 - b) Find the candidate key.
 - c) Find the canonical cover.
- Q4** Consider the following relations: (16)
PERSON(P_id, F_name, L_name, Occupation, Salary, City)
ORDER(O_id, P_id, Item, Quantity, Price, Order_date)
The Primary Keys are P_id and O_id respectively.
Express the following queries in SQL and Relational Algebra.

- a) Find the person's name and city whose name starts with S.
- b) Find the person with the highest salary.
- c) Find the average salary for each Occupation.
- d) Find the detail of the person who has ordered any item.
- e) Find the name of the person who has ordered in the same date.
- f) Find the name of the person who hasn't ordered any item.
- g) Find the highest ordered item.
- h) Find the detail of Item with lowest Price.

Q5 What are the various types of database failure? Explain Log-Based recovery scheme by showing the immediate and deferred database modification with proper example. (16)

Q6 What is ER model? Draw the detailed ER diagram for BPUT university database systems. (16)