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TCS–503

B. TECH. (CSE) (FIFTH SEMESTER)
END SEMESTER
EXAMINATION, Dec., 2023

DATABASE MANAGEMENT SYSTEM

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 sub-question carries 10 marks.

1. (a) What is the DBMS ? Discuss the advantage over the flat file system. What is the use of data dictionary in a database system ? (CO1)

(b) (i) Explain three layer-architecture with a neat diagram. What is data independence ? (CO1)

(ii) Illustrate the role of DBA in DBMS.

(c) Describe the three-schema architecture with suitable diagram. What is the difference between logical data independence and physical data independence ? Which one is to achieve harder ? Why ? (CO1)

2. (a) (i) What is E-R Model ? Explain different types of attribute with example. (CO2, CO1)

(ii) Design E-R diagram for a university database schema and also convert it into relation schema.

(b) What do you mean mapping cardinalities ? Explain total participation and partial participation. (CO2, CO1)

(c) Define the following : (CO2, CO1)

(i) Specialization and generalization

(ii) Weak entity and strong entity type

(iii) DBMS Catalog file and Metadata.

3. (a) What is SQL ? Define its characteristics. Explain the several types of SQL commands (DDL, DML, DCL, and DQL). (CO3)

(b) Consider the following relation schema for the SALES database : CUSTOMER(Cust No, Cust_name, Address), ORDER (Order No. Order_date, Cust No. Qty, Amount), PRODUCT (ProdNo, Price, Order No.) Specify the foreign key constraints to the SALES database. Also insert some tuples in the relations and some examples of deletion of tuples that violate referential integrity constraints. Make any assumption whenever necessary. (CO3)

(c) (i) What is the relational algebra ? Write the difference between cross join natural join, left outer join and right outer join with suitable example.

(ii) What is stored procedure ? When they are beneficial ? Give the syntax and example of creating a procedure and function is SQL. (CO3)

4. (a) Explain functional dependency and its type ? Consider the relation R (A, B, C, D, E,) with following fundamental dependencies AB->C, CD->E and DE->B . Is AE a candidate key of this relation ? If not which is the candidate key ? Explain. (CO4)

(b) Describe the use of normalization and explain 1NF, 2NF, 3NF with suitable ? A relation R(A,C,D,E,H) having Two FD F and G as shown :

set F={A,->C, AC->D, E->AD, E->H}

set : G={A->CD, E->AH}

Are F and G equivalent ? (CO4)

(c) What are the lossy and lossless decompositions ? Consider the two set FD F={A->C,AC->D,E->AD,E->H} and

G={A->CD, F->AH}

check whether or not they are equivalent. (CO4)

5. (a) What is ACID Property ? During its execution, a transaction passes though several states until it finally or aborts. List all possible sequences of state through which a transaction may pass. (CO5)

(b) Explain the working of the locking technique in the concurrency control. What benefits does rigorous two phase locking provides ? (CO5)

(c) Explain schedule and its type. Given two schedules S1 and S2 which one is conflict serializable schedule ? (CO5)

S1 :R1(X) R1(Y) R2(X) R2(Y) W2(Y) W1(X)

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