CBCS SCHEME

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15CS53

Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Database Management System

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define DBMS. Discuss the advantages of DBMS over the traditional file system. **(08 Marks)**

b. Explain the component modulus of DBMS and their interaction, with the help of a diagram. **(08 Marks)**

OR

2 a. Define the following with an example :
i) Weak entity type ii) Participation constraints
iii) Cardinality ratio iv) Recursive relationship. **(08 Marks)**

b. Draw an ER diagram of Banking system taking into account atleast five entities, indicate all keys, constraints and assumptions that are made. **(08 Marks)**

Module-2

3 a. Describe the characteristics of relations with suitable example for each. **(08 Marks)**

b. What are the basic operations that can change the states of relations in the database? Explain how the basic operations deal with constraint violations. **(08 Marks)**

OR

4 a. Describe the steps of an algorithm for ER – to – relational mapping. **(10 Marks)**

b. In SQL which command is used for table creation? Explain how constraints are specified in SQL during table creation with suitable example. **(06 Marks)**

Module-3

5 Consider the following schema of order database
SALESMAN (Salesmanid, name, city, commission);
CUSTOMER (Custid, custname, city, grade, salesmanid);
ORDERS (Ordno, purchaseamt, orddate, custid, salesmanid);
Write SQL queries for the following:
i) Find the name and numbers of all salesman who had more than one customer.
ii) Count the customers with grade above Bangalore's average.
iii) List all the salesman details whose first name is 'John'.
iv) List all salesman and indicate those who have and don't have customers in their cities (Use UNION operation).
v) Use the delete operation by removing salesman with id = 2000. **(16 Marks)**

OR

6 a. Explain three-tier architecture with neat diagram. **(08 Marks)**

b. Define stored procedure. Explain creating and calling of stored procedure with an example. **(08 Marks)**

Module-4

7 a. Explain the informal design guidelines used as measures to determine the quality of relation schema design. **(08 Marks)**

b. Define Normal form. Explain 1NF, 2NF and 3NF with suitable examples for each. **(08 Marks)**

OR

8 a. Define Minimal cover. Write an algorithm for finding a minimal cover F for a set of functional dependencies E. Find the minimal cover for the given set of FDs be **(08 Marks)**
E : {B →A , D → A , AB → D}.

b. Consider the universal relation R = {A, B, C, D, E, F, G, H, I, J} and the set of functional dependencies **(08 Marks)**
F = {{A, B} → {C} , {A} →{D, E} , {B} → {F} , {F} → {G, H} , {D} → {I, J}}.
Determine whether each decomposition has the lossless join property with respect to F.
$D_1 = \{R_1, R_2, R_3\}$; $R_1 = \{A, B, C, D, E\}$; $R_2 = \{B, F, G, H\}$; $R_3 = \{D, I, J\}$.

Module-5

9 a. Discuss the ACID properties of a database transaction. **(04 Marks)**

b. Why Concurrency control is needed? Demonstrate with an example. **(12 Marks)**

OR

10 a. Discuss the UNDO and REDO operations and the recovery techniques that use each. **(06 Marks)**

b. Discuss the time – stamp ordering protocol for concurrency control. **(05 Marks)**

c. Explain how shadow paging helps to recover from transaction failure. **(05 Marks)**

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