II B. Tech II Semester Regular/Supplementary Examinations, July - 2023
DATABASE MANAGEMENT SYSTEMS
(Common to CSE,CST,CSE(CS),CSE(IOTCSIBCT),CSE(CSBS),CSE(IOT),&CS)

Time: 3 hours   **Max. Marks: 70**

Answer any **FIVE** Questions, each Question from each unit
All Questions carry **Equal** Marks
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UNIT-I

1 a) Explain the difference between external, logical and physical level schemas.   [7M]
        How are these different schema layers related to the concepts of logical and
        physical data independence?
   b) Describe the concept of centralized Vs client/server model   [7M]

Or

2 a) Draw and explain the detailed system architecture of DBMS.   [7M]

   b) Explain Data Independence and its types in detail.   [7M]

UNIT-II

3 a) Write SQL statements for following: [10M]
        Student(Sno, Sname, courseId, email_id, Mobileno)
        Course(CID, Cname, Cduration)
        i)   Add a column city in student table.
        ii)   Find out list of students who have enrolled in "AIML" course.
        iii)   List name of all courses with their duration.
        iv)   List name of all students start with "R"
        v)   List email_Id and Mobileno of all Computer Science Engineering students.
   b) What is an integrity constraint? Explain its enforcement by DBMS with illustrative [4M]
        example.

Or

4 a) Write SQL statements for the following: [7M]
        Sailors(sid, sname, rating, age)
        Boats(bid, bname, color)
        Reserves(sid, bid, day)
        i)   Find the sids of all sailors who have reserved red boats but not green
                boats.
        ii)   Find all sids of sailors who have a rating of 10 or reserved boat 104.
        iii)   Find the names of sailors who have reserved boat 110.
        iv)   Find the names of sailors who have reserved all boats.
        v)   Find the average age of sailors with a rating of 7.
   b) Explain two aggregate functions of SQL.   [7M]

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UNIT-III

5   a)   A university database contains information about professors (identified by SSN) and courses (identified by courseid). Professors teach courses; each of the following situations concerns the Teaches relationship set. For each situation draw an ER diagram that describes it.   [7M]

     i)   Professors can teach the same course in several semesters, and each offering must be recorded.

     ii)   Professor can teach the same course in several semesters, and only the most recent such offering needs to be recorded.

     iii)   Every professor must teach some course

     iv)   Every professor teaches exactly one course

     v)   Every professor teaches exactly one course and every course must be taught by some professor.

  b)   With the aid of appropriate examples, describe how to model the following in ER model: [7M]

i) Entity type   ii) Relationship type   iii) Super class   iv) Sub class

Or

6   a)   Differentiate between specialization and generalization with ER diagram.   [7M]

  b)   Explain about various constraints used in ER-model.   [7M]

UNIT-IV

7   a)   Explain the difference between BCNF and 3NF briefly.   [7M]

  b)   State 1NF, 2NF & 3NF and explain with examples.   [7M]

Or

8   a)   What is the importance of dependency preservation during decomposition? How to achieve it? Explain insertion, deletion, and modification anomalies.   [7M]

  b)   What is functional dependency? Write an algorithm to find minimal cover for set of functional dependencies. Construct minimal cover m for set of functional dependencies which are: [7M]

E : { B $\rightarrow$ A, D $\rightarrow$ A, AB $\rightarrow$D}

UNIT-V

9   a)   Explain different types of locks used in concurrency control.   [7M]

  b)   Explain the recovery algorithm in detail.   [7M]

Or

10   a)   How the organization of a file helps us to reduce the complexities involved in executing various File operations like search, insert and update? Explain.   [7M]

   b)   Write short notes on: i) Primary index   ii) Clustered index   iii) Secondary index.   [7M]

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SET - 2

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UNIT-I

1	a)	Explain the architecture of Database systems and some representative applications of them in detail.	[7M]
	b)	How database systems are modeled with request-reply operations? Explain the role of client server organization in it.	[7M]

Or

2	a)	In detail describe the advantages and representative applications of database systems.	[7M]
	b)	What is data independence? How it is modeled with three tier architecture of database systems? Explain in detail.	[7M]

UNIT-II

3	a)	Write and explain the SQL functions Date and Time, Numeric, String conversion	[7M]
	b)	What is relational model? Explain the concepts of domain, attribute and relation with an example.	[7M]

Or

4	a)	Explain basic SQL querying operations select and project using where clause.	[7M]
	b)	What are various key constraints? Explain them in detail with their importance.	[7M]

UNIT-III

5	a)	Design ER-Model for banking systems and explain specialization and generalization operations using ER-Model.	[7M]
	b)	Illustrate the implementation of different types of JOIN operations.	[7M]

Or

6	a)	Give an example scenario motivating key constraints, weak entities, class hierarchy and aggregation of ER model design constructs.	[7M]
	b)	Explain the Grouping, Ordering and Aggregation operations with an example each.	[7M]

UNIT-IV

7	a)	Explain 1NF, 2NF and 3NF in detail with suitable examples.	[7M]
	b)	What is dependency closure F^+ of a set of FDs? What the attribute closure X^+ of a set of attributes X with respect to a set of FDs F?	[7M]

Or

8   a)   Discuss the requirements for schema refinement and principles of dependency   [7M]
         preserving with examples.
    b)   Consider the relation schema R(A,B,C,D) which has FD B➔C, A is a candidate   [7M]
         key. What are the possibilities to keep R in BCNF. Explain with principle of BCNF.

                                      UNIT-V

9   a)   What are the techniques used to organize the data in an index for efficient retrieval   [7M]
         of data entries.
    b)   Differentiate serializable schedule, recoverable schedule and strict schedule.   [7M]
         Describe the implementation of testing for serializability in detail.

                                        Or

10 a)   Give the structure of B+ tree. And perform insertion, deletion and search operations   [7M]
         on it.
    b)   Write about concurrent executions. How do they enforce integrity and   [7M]
         recoverability? Explain with example.

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UNIT-I

1 a) "A database system is a collection of interrelated data and a set of programs"-Justify this statement with different views of data. [7M]

   b) Present the model of database system with client server organization and explain the query processing. [7M]

Or

2 a) What is conceptual schema? Describe its role in the structure of a database model. [7M]

   b) Write about the concepts of data base users, instance and data independence in detail. [7M]

UNIT-II

3 a) Write queries to perform Numeric, String conversion and explain. [7M]

   b) Differentiate domain key constraints and Integrity key constraints with suitable examples. [7M]

Or

4 a) How to define tables in relational model? Illustrate the operations of create and alter and other data definition operations. [7M]

   b) Explain the reasons for enforcing integrity constraints. And also the role of constraints in transactions. [7M]

UNIT-III

5 a) Design ER-Model for e-commerce system and explain the notion of super class and sub class with respect to inheritance. [7M]

   b) What operations can be used to manipulate the data in a single relation? Give Examples. [7M]

Or

6 a) Consider university data base Professor (ssn-id), course(c-id). Professors teach courses. Draw ER model and explain the various operations on it. [7M]

   b) "Join can be cross product followed by selection and projection"- Justify this statement with several variants of join operation. [7M]

UNIT-IV

7 a) Discuss the motivation for putting a relation in 4NF and 5NF. Differentiate both of them with examples. [7M]

   b) Explain the concepts of Functional dependency with suitable example and its operations like closure and minimal cover. [7M]

Or

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8 a) Define functional dependency. Give set of FDs for the relation schema R(A,B,C,D) [7M]
      with primary key AB under which R is in 1NF but not 2NF and R is in 2 NF but not
      in 3 N.
   b) What is decomposition? Explain the properties of decomposition and the role of [7M]
      normalization.

<center>UNIT-V</center>

9 a) What is lock manager? Explain implementing lock and unlock requests, atomicity of [7M]
      locking and unlocking, latches and convoys.
   b) With an example explain the insertion and deletion operations performed and B+ [7M]
      trees.

<center>**Or**</center>

10 a) Explain the operations of Creating, terminating transactions and Transaction [7M]
      characteristics in detail.
   b) Describe the role of indexing in file organization. Explain implementation of cluster [7M]
      indexes with example.

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UNIT-I

1 a) Draw and explain the database system's Two-tier and three-tier architectures. [7M]

   b) Explain the characteristics of database systems and design database for University [7M]
       system.

Or

2 a) Describe the role and responsibilities of Database Users-Actors on Scene, Workers [7M]
       behind the scene in detail.
   b) What are the different data models? Explain its types in detail. [7M]

UNIT-II

3 a) What operators can be used to specify the conditions in SQL queries? Explain the [7M]
       role of selection and projection with examples.
   b) Discuss the concepts of domain, attribute, tuple, relation, null values and [7M]
       constraints

Or

4 a) What SQL construct enables the definition of a relation? What constructs allow [7M]
       modification of relation instances? Give examples.
   b) Illustrate importance of SQL. Write the queries to implement arithmetic & logical [7M]
       operations and explain.

UNIT-III

5 a) With sample ER-model explain the concepts of Entity set and relationship set, One- [7M]
       many and many-many relationship and Aggregation and role indicator in detail.
   b) What is the purpose of creating view table? Explain the types of updatable and non- [7M]
       updatable views with examples.

Or

6 a) Draw ER diagram for Airport database. Indicate various attributes of each entity and [7M]
       relationship set. And also specify key, participation and covering constraints in it.
   b) Describe the importance of nested queries. Give its application in performing [7M]
       various aggregation operations.

UNIT-IV

7 a) Consider relation R(A,B,C,D,E,F) and FDs A $\rightarrow$ BC, F $\rightarrow$ A,C $\rightarrow$ AD $\rightarrow$ E, E $\rightarrow$ D. [7M]
       AD is the decomposition of R into R1(A,C,D) R2 (B,C,D) andR3 (E,F,D) loss less?
        Explain the requirement of Lossless decomposition?
   b) What are the advantages of normalized relations over the un-normalized relations? [7M]

Or

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8   a)   Describe an algorithm for computing the minimal cover of a set of Functional   [7M]
         Dependency's and illustrates its application in 3NF with an example?
    b)   What is decomposition operation? Explain variants of decomposition operation with   [7M]
         examples.

UNIT-V

9   a)   How is the log used in transaction rollback and crash recovery? Explain.   [7M]

    b)   What does Extendible hashing use a directory of buckets? How does it handles   [7M]
         insert and delete operations?

Or

10 a)   How to achieve dynamic multilevel indexing using B-Trees? Explain.   [7M]

    b)   Explain the states of Transaction. How to implement the Atomicity and Durability   [7M]
         properties? Explain.

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