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Code No: 154AM **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year II Semester Examinations, April/May - 2023
DATABASE MANAGEMENT SYSTEMS
(Common to CSE, IT, ECM, CSBS, CSIT, ITE, CSE(AI&ML), CSE(DS))

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	What are the goals of DBMS?	[2]
b)	Explain about DML language and query processor.	[3]
c)	Distinguish between super key and Candidate key.	[2]
d)	Explain Domain relational calculus.	[3]
e)	Define dependency preserving decomposition.	[2]
f)	What is the difference between 3NF and BCNF?	[3]
g)	Explain about durability of transaction.	[2]
h)	What is transaction? Explain its states.	[3]
i)	Why are tree-structure indexes are good for searches, especially range selections.	[2]
j)	What is the main difference between ISAM and B+ tree indexes?	[3]

PART – B

(50 Marks)

2.a) Identify the main components in a DBMS and briefly explain what they do?
b) Explain the following:
i) View of Data
ii) Data Abstraction
iii) Instances and Schemas. [5+5]

OR

3.a) What is data model? Explain Relational Model and E-R model.
b) Draw an ER-Diagram for Library Management system. [5+5]

4.a) Differentiate between a relation schema and relation instance define the term arity and degree of a relation.
b) Let R =(ABC) and let r1 and r2 both relations on schema R . Give an expression in the Domain relational calculus that is equivalent to each of the following: [5+5]
i) $\prod_A(r1)$ ii) $\sigma_{B=17}(r1)$ iii) $r1 \cap r2$

OR

5.a) What is Relational Model? Explain about various domain and integrity constraints in Relational Model with examples.
b) Explain various fundamental operations in relational algebra with examples. [5+5]

6.a) What aggregate operators does SQL support ? Explain.
b) Define Functional dependencies and Multi valued dependencies. How are primary keys related to FDs? [5+5]

OR

7.a) What are the conditions are required for a relation to be in 4NF and 3NF explain with examples.
b) Explain various set operations are used in SQL with examples. [5+5]

8.a) What is locking Protocol? Describe the Strict Two Phase locking Protocol.
b) Explain multiple granularity concurrency control scheme. [5+5]

OR

9.a) Explain the ACID Properties of transactions.
b) What is log file? Explain the following log based recovery schemes.
i) Deferred data base modification
ii) Immediate data base modification. [5+5]

10.a) Explain about cluster index, primary and secondary indexes with examples.
b) Explain Deletion and insertion operations in ISAM with examples. [5+5]

OR

11.a) Explain what are the differences between tree based and Hash based indexes.
b) Explain deletion and insertion operation in *B+ trees*. [4+6]

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Code No: 154AM

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year II Semester Examinations, August/September - 2021
DATABASE MANAGEMENT SYSTEMS
(Common to CSE, IT, ITE)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
- - -

1.a) Discuss about levels of abstraction in a DBMS.
b) What is a data model? What are the different data models? Explain. [7+8]

2.a) Define ER model and explain the following kinds of constraints that can be specified in the ER diagram, and give an example of each: i) key constraint ii) participation constraint.
b) Discuss the functionality of query evaluation engine. [8+7]

3.a) Discuss in detail about the properties of relation algebra.
b) Compare tuple relational calculus and domain relational calculus. [7+8]

4. Consider the following relations
Sailors (sid, sname, rating, age)
Boats (bid, bname, color)
Reserves (sid, bid, day)
Write the statements in Relational Algebra, Relational Calculus, Domain Relational Calculus and SQL for the following questions.
a) Find the names of sailors who have reserved a Red boat.
b) Find the names of sailors who have reserved at least one boat.
c) Find the names of sailors who have reserved a Red and a Green boat.
d) Find the names of sailors who have reserved a Red or a White boat.
e) Find the names of sailors who have reserved all boats. [15]

5.a) What are the steps to be followed to convert a relation in 3NF to BCNF?
b) Discuss the importance of entity integrity and referential integrity constraints. [8+7]

6.a) When is the decomposition of a relation schema R into two relation schemas X and Y said to be lossless-join decomposition? Why is this property so important? Give a necessary and sufficient condition to test whether a decomposition is lossless-join.
b) Discuss fourth normal form with illustration. [8+7]

7.a) Discuss in detail about timestamp based concurrency control techniques.
b) Write about Log based recovery. [8+7]

8.a) State and explain various file organization methods. Give suitable examples to each of them.
b) What are the Pros and Cons of ISAM? [8+7]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, August/September - 2022
DATABASE MANAGEMENT SYSTEMS
(Common to CSE, IT, ECM, CSBS, CSIT, ITE, CSE(AIML), CSE(DS))

Time: 3 Hours **Max.Marks:75**

Answer any five questions
All questions carry equal marks
- - -

1.a) Draw and explain the structure of a DBMS.
b) Explain generalization and specialization concepts with an example. [7+8]

2.a) What is ER model? Explain the basic symbols used for entities, attributes and relationships.
b) What is an attribute? Explain various types of attributes with examples. [9+6]

3.a) Explain integrity constraints over relations.
b) How to alter, destroy tables and views? Give example queries. [7+8]

4.a) Give a brief note on views.
b) Explain fundamental operations in relational algebra with examples. [8+7]

5. What is meant by normalization? Explain in detail various normal forms with an example. [15]

6. Explain the following with any example queries.
a) Set operations.
b) Aggregate operations. [7+8]

7.a) How to test serializability of a schedule? Explain with an example.
b) Explain log-based recovery protocol. [8+7]

8.a) What is the purpose of indexing in DBMS? Explain secondary indexing with suitable diagram.
b) What is meant by file organization? Explain in brief about Indexed Sequential Access Method (ISAM). [8+7]

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Code No: 154AM **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester (Special) Examinations, January/February - 2021
DATABASE MANAGEMENT SYSTEMS
(Common to CSE, IT)

Time: 2 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
- - -

1. Explain the functions of Database Administrator. [15]

2. What is Relational Model? Distinguish between Super key, Candidate key, Primary Key for a relation with examples. [15]

3. What is normalization? Explain 2NF, 3NF and BCNF Normal forms with example. [15]

4. What is serializability? Explain conflict and view is serializability in detail. [15]

5. Describe insertion and deletion operations in B+ tree with example. [15]

6.a) Explain various levels of data abstraction and data independence.
b) Define generalization, specialization and aggregation? How it is represented in E-R Model? [7+8]

7. Let R = (ABC) and let r1 and r2 both relations on schema R. Give an expression in the tuple relational calculus that is equivalent to each of the following.
a) $\prod_{A1,}$(r1) b) $r1 \cap r2$ c) r1- r2 [5+5+5]

8. Explain various data manipulation and data definition statements in SQL with examples. [15]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, July/August - 2021
DATABASE MANAGEMENT SYSTEMS
(Common to CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
- - -

1.a) Define data model. Explain the entity-relationship model with a neat diagram.
b) How can we translate an ER Diagram into SQL statements to create tables? Discuss. [7+8]

2.a) Describe the set operations of relational algebra, including union (U), set difference (-), and cross product (X). For each, what can you say about the cardinality of their input and output tables?
b) Compare and contrast the Tuple Relational Calculus and Domain relational calculus. [8+7]

3.a) Briefly explain the complex integrity constraints in SQL Triggers and active databases.
b) Why is a table whose primary key consists of a single attribute automatically in 2NF when it is in 1NF? Explain in detail. [5+10]

4.a) Discuss the Recovery with Concurrent Transactions.
b) Elaborate the Timestamp Based Protocols. [8+7]

5. Compare and contrast the Hash-Based Indexing and Tree-based Indexing. [15]

6.a) Explain the differences between physical and logical data independence.
b) Define a trigger. What are the differences between row-level and statement-level triggers? [8+7]

7. Give an example that illustrates how a collection of relations in BCNF could have redundancy even though each relation, by itself, is free from redundancy. [15]

8.a) What is Transaction? List and explain the properties of Transaction.
b) How does a B+ tree index handle the search, insert and delete? Discuss. [8+7]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year II Semester Examinations, March - 2022
DATABASE MANAGEMENT SYSTEMS
(Common to CSE, IT, ITE)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
- - -

1. Explain any five applications of DBMS. [15]

2. What is Entity set and also define Relationship set. List and explain the symbols used to draw ER Diagram. [15]

3. What is a view? How to specify a view? Write about view implementation techniques. [15]

4. Discuss briefly about Domain relational calculus with suitable example. [15]

5. State 1NF, 2NF and 3NF and explain with examples. [15]

6. What is Functional Dependency? Explain types and properties of FD's. [15]

7. Discuss about transaction recovery techniques. [15]

8. Explain in detail about external hashing techniques. [15]

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Code No: 154AM **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year II Semester Examinations, November/December - 2020
DATABASE MANAGEMENT SYSTEMS
(Common to CSE, IT)

Time: 2 Hours **Max. Marks: 75**

Answer any Five Questions
All Questions Carry Equal Marks
- - -

1.a) What is DBMS? List four significant difference between file processing system and a DBMS?
b) What is E-R model? Draw an E-R Diagram for any Banking enterprise system. [6+9]

2.a) Explain about outer join operation in relational algebra.
b) Explain about domain relational calculus with example. [7+8]

3.a) Explain the following Operators in SQL with examples
i) SOME ii) IN iii) EXCEPT iv) EXISTS
b) Explain various DML functions in SQL with examples. [8+7]

4. Explain shadow paging recovery scheme for recovering the data base? [15]

5. Explain deletion and insertion operations in linear hashing with examples. [15]

6.a) Explain about various database users and administrators in DBMS.
b) Draw an ER-Diagram for Week entity set and Strong entity set with example. [7+8]

7.a) Explain modification of the database operations in relational algebra with example.
b) Explain about domain relational calculus with example. [8+7]

8. What is normalization? Explain 4NF and 5NF Normal forms with example. [15]

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