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B. TECH.
(SEM V) THEORY EXAMINATION 2021-22
DATABASE MANAGEMENT SYSTEM

Time: 3 Hours**Total Marks: 100****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

- 1. Attempt all questions in brief. 2 x 10 = 20**
- a. What is the significance of Physical Data Independence?
 - b. List the four functions of DBA.
 - c. When a relation set is called a recursive relationship set?
 - d. What do you mean by currency with respect to database?
 - e. What is Relational Calculus?
 - f. What is Equi-Join in database?
 - g. What is a CLAUSE in terms of SQL?
 - h. Define the closure of an attribute set.
 - i. When is a transaction Rolled Back?
 - j. List the various levels of locking?

SECTION B

- 2. Attempt any three of the following: 10 x 3 = 30**
- a. Draw the overall structure of DBMS and explain its various components.
 - b. Which relational algebra operations require the participating tables to be union-compatible? Give the Reason in detail.
 - c. What do you understand by transitive dependencies? Explain with an example any two problems that can arise in the database if transitive dependencies are present in the database.
 - d. List ACID properties of transaction. Explain the usefulness of each. What is the importance of log?
 - e. What do you mean by time stamping protocol for concurrency controlling? Discuss multi version scheme of concurrency control.

SECTION C

- 3. Attempt any one part of the following: 10 x 1 = 10**
- (a) What are the different types of Data Models in DBMS? Explain them.
 - (b) State the procedural DML and nonprocedural DML with their differences.
- 4. Attempt any one part of the following: 10 x 1 = 10**
- (a) Consider the following schema for institute library:
Student (RollNo, Name, Father_Name, Branch)
Book (ISBN, Title, Author, Publisher)
Issue (RollNo, ISBN, Date-of-Issue)
Write the following queries in **SQL and relational algebra**:
 - I. List roll number and name of all students of the branch 'CSE'.
 - II. Find the name of student who has issued a book published by 'ABC' publisher.
 - III. List title of all books and their authors issued to a student 'RAM'.
 - IV. List title of all books issued on or before December 1, 2020.
 - V. List all books published by publisher 'ABC'.
 - (b) What do you mean by trigger? Explain it by a suitable example.

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5. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) Describe Armstrong's axioms in detail. What is the role of these rules in database development process?
- (b) Describe the term MVD in the context of DBMS by giving an example. Discuss 4NF and 5NF also.
6. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) Describe serializable schedule. Discuss conflict serializability with suitable example.
- (b) Discuss the procedure of deadlock detection and recovery in transaction?
7. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) Given a schedule S for transactions T1 and T2 with set of read and write operations,
S: R1(X) R2(X) R2(Y) W2(Y) R1(Y) W1(X).
Identify, whether given schedule is equivalent to serial schedule or not?
- (b) Discuss 2 phase commit (2PC) protocol and time stamp based protocol with suitable example. How the validation based protocols differ from 2PC?

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