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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)
  - 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?