Time: 3 Hours **Max. Marks: 80**

NB:
1. Question No. 1 is compulsory and solve any THREE questions from remaining questions
2. Assume suitable data if necessary
3. Draw clean and neat diagrams

Q.1 Attempt any four Marks

a. Explain different types of attributes with example. 5
b. Define Generalization & Specialization. 5
c. Explain total participation & partial participation 5
d. Explain different Database Languages. 5
e. Draw Transaction state diagram 5

Q.2. a. Define functional dependencies and different types of functional dependencies:
Consider the relation scheme R = {E, F, G, H, I, J, K, L, M, N} and the set of functional dependencies {{E, F} -> {G}, {F} -> {I, J}, {E, H} -> {K, L}, K -> {M}, L -> {N} on R. What is the Candidate key for R?

b. Construct an ER diagram for a Banking Management System 10

Q.3.a Explain different types of operations in relational algebra. 10

b. Consider the following schema for the institute Library. 10

Student (Rollno, Name, Age, Branch)
Book (ISBN, Title, Author, Publisher)
Issue (Rollno, ISBN, Date_of_Issue)

Write SQL queries for the following statements.
i. List Roll Number and Name of all students of the branch CSE.
ii. Find the name of students who have been issued a book published by ABC publisher.
iii. List title of all books and their author issued by student Prashant.
iv. Find the Total number of students in each branch.

Q.4.a. Consider a relation R with five attribute ABCDE. You are given the following dependencies: 10

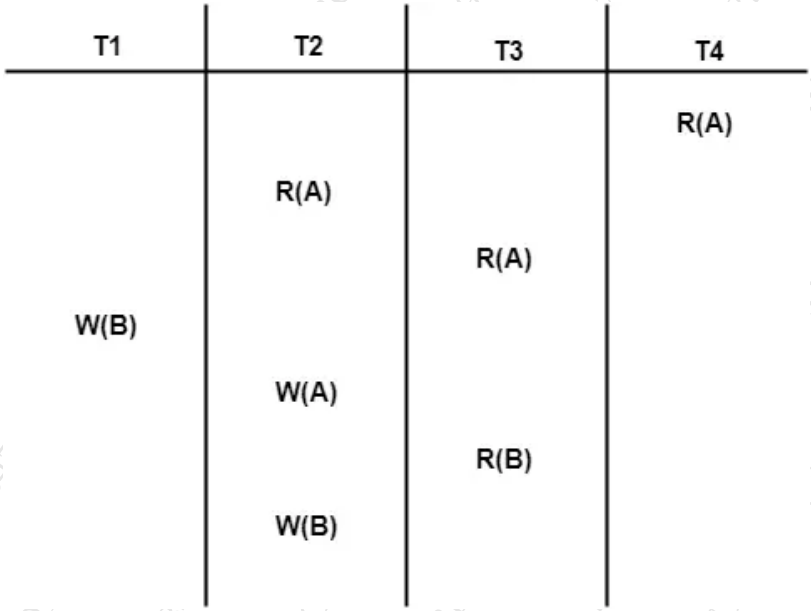
$A \rightarrow B$ $BC \rightarrow E$ $ED \rightarrow A$

i. List all keys for R
ii. Is R in 3NF.
iii. Is R in BCNF.

b. What is Normalization? Explain 1NF, 2NF, 3NF with example. 10

Q.5. a Explain types of Integrity Constraints with example. 10

b. Check whether the given schedule S is Conflict serializable or not. Also define. different types of serializability. 10



Q.6 Write notes on **any two**

a) ACID Properties. 10

b) DDL and DCL commands. 10

c) Keys in DBMS. 10

d) Log based Recovery 10

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