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

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N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

Q.1 Attempt any four **Marks**

a. Define DBA. Discuss role DBA. 5
b. Define entity and types of entities. 5
c. Explain Views in SQL. . 5
d. Write ACID properties of transactions. 5
e. Explain attributes and its types. 5

Q.2. a. Solve all queries below using only select, project, Cartesian product, and natural join. 10

First Schema
Suppliers (sID, sName, address)
Parts (pID, pName, colour)
Catalog (sID, pID, price)
Catalog[sID] ⊆ Suppliers[sID]
Catalog[pID] ⊆ Parts[pID]

i. Find the names of all red parts.
ii. Find all prices for parts that are red or green. (A part may have different prices from different manufacturers.)
iii. Find the sIDs of all suppliers who supply a part that is red or green.

b. What is serializability? Explain different types of serializability used in transactions. 10

Q.3.a Draw the Database Architecture and explain in detail. 10

b. Consider the following schema for institute Library. 10

Student (Rollno, Name, Father_name, 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 issued a book published by ABC publisher.
iii. List title of all books and their author issued by student Prashant
iv, List title of all books issued on or before 1st FEB 2021.

Q.4.a.	What is Normalization? Explain 1NF, 2NF, 3NF with example.	10
b.	Write difference between File systems v/s Database systems	10
Q.5.a	Draw ER Diagram for Hospital management system.	10
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b.	Explain aggregation functions in SQL with proper examples	10
Q.6	Write notes on **any two**	
	a). DDL commands	10
	b) Transaction states	10
	c) Functional Dependencies	10

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