(Time: 3Hours) **Marks: 80**

Note: 1) Question no. 1 is compulsory.
2) Solve any three out of remaining five questions.
3) Assume suitable data wherever necessary.

Q.1. a) Define Generalization and Specialization. 5
b) Compare the traditional file system with Database. 5
c) What are the different aggregate functions used in SQL? Explain with the help of examples. 5
d) Explain triggers with examples. 5

Q.2. a) 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 JAN 2014
b) Explain the operation on files. 10

Q.3. a) Define normal forms and explain with suitable example First, Second and Third normal forms. 10
b) Discuss the basic operations that can perform using relational algebra. 10

Q.4. a) Define the following terms 10
i. Nested Queries
ii. DBA
b) Consider a relation R with five attributes ABCDE. You are given the following dependencies:
$A \rightarrow B$ $BC \rightarrow E$ $ED \rightarrow A$ 10
i. List all keys for R
ii. Is R in 3NF
iii. Is R in BCNF

Q.5. a) Discuss the different security and authorization mechanisms in Database Management System. 10
b) What is SQL Indexes? Explain types of Indexes with examples. 10

Q.6. a) Define Key Constraints and Referential Constraints. Explain the concept of foreign key with example. 10
b) Define the following terms 10
i. Weak Entity Set
ii. Total Participation
iii. Partial Participation
iv. Entity Type
