



विश्वजीवनामृतं ज्ञानम्

ABV- Indian Institute of Information Technology & Management, Gwalior

Database Systems (IT205)

Major Examination (Session 2023–24)

Maximum Time: 3 Hours

Max Marks: 45

Note: Attempt all questions. Marks are indicated against each question.

1. (a) Explain the architecture of a DBMS with a neat diagram. (b) Differentiate between SQL and NoSQL with examples. (6 Marks)
2. Consider the following relations: **Student**(Roll, Name, Dept, Year) **Course**(CID, CName, Credits) **Enroll**(Roll, CID, Grade)
Write SQL queries for: (i) List names of students enrolled in "Database Systems". (ii) Find number of students per department. (iii) Display roll numbers of students who got grade 'A'. (iv) Retrieve students who are enrolled in all courses. (8 Marks)
3. (a) Define Serializability. Differentiate between Conflict and View Serializability. (b) What is Deadlock in transaction management? How can it be prevented? (7 Marks)
4. Explain the following with examples: (i) Lossless join decomposition (ii) Multivalued dependency (iii) BCNF and 4NF (8 Marks)
5. (a) Discuss the concept of Query Optimization. Why is it necessary? (b) Write short notes on: (i) Recovery Systems (ii) Indexing and Hashing Techniques (8 Marks)
6. Case Study: A university database maintains records of Departments, Professors, Students, and Courses. Professors belong to Departments, Students enroll in Courses, and Courses are taught by Professors.
(i) Draw an ER diagram for the above system. (ii) Convert the ER model into Relational Schema. (iii) Write two SQL queries for the schema. (8 Marks)