DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
UNIVERSITY INSTITUTE OF ENGINEERING AND TECHNOLOGY,
CSJM UNIVERSITY, KANPUR

Subject- Database Management System (CSE-S 301)

Semester- 2024-2025 (Odd Semester) Year: **3rd Year, V Semester (2K22-CSE)**

First Mid Semester Examination, 09-09-2024, Shift-IV

Time: 1:30 hours Maximum Marks: 30

Note: All questions are compulsory.

Section A

Each question in this section carries 01 marks

1. A major purpose of DBMS is to provide users with an _____ view of data.
2. _____ is a language that enables users to access or manipulate data
3. _____ model provides convenient graphical representation of data.
4. _____ _____ ensures that concurrent transactions executions proceed without conflicts.
5. Information about structure of the data is kept in _____ _____.
6. Diamond shape in ER diagram represents _____.
7. Primary Key is selected from the set of _____ key
8. The set of allowed values for each attribute is called the _____ of the attribute
9. _____ SQL command return rows of the input relation that satisfy the predicate

Section B

Each question in this section carries 03 marks

10. What are the steps involved in query processing. Explain using a diagram?
11. What are the different possible classification of attributes, give an example of each?
12. Mention the design issues while modelling a database?

Section C

Each question in this section carries 06 marks

13. Consider a organization for which you have to design a database. Consider you identify three entities as follows

    Employee(Empid, EmpFName, EmpSal, Deptid)
    Department(Deptid, DeptName, DeptManager, DeptLocation)
    Project(Projid, ProjName, ControlingDept, ProjBudget)

    Draw a ER diagram to show all the entities, attributes and relationships
    Write a DDL statement for Employee schema

14. Consider the schema given in Q13 above to writing the DML statement for following queries?

    (i) Find name of departments whose name start with letter "M" and its budget is above 10000

    (ii) Find average salary of each department.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING,
UNIVERSITY INSTITUTE OF ENGINEERING AND TECHNOLOGY,
CSJM UNIVERSITY, KANPUR

Database Management System (CSE-S 301)

B.Tech-CSE-2K22

Semester- 2024-2025 (Odd Semester) **Year: III Year, V Semester (B.Tech-CSE-2K22)**

End Semester Examination, 02/12/2024, Shift-II (02:00 PM-5:00 PM)

Time: 03:00 hours **Maximum Marks: 50**

Note: All questions are compulsory.

Important: Attempt questions section wise and in order.

Mention correct question number with every answer you attempt

Section A

This section is of 10 marks (10 Questions of 1 mark each)

1. A collection of conceptual tools for describing data, relationships, semantics and constraints is referred to as .....
   (A) Data Model (B) E-R Model (C) DBMS (D) All of the above

2. ..... is a bottom-up approach in which two lower level entities combine to form a higher level entity.
   (A) Aggregation (B) Specialization (C) Generalization (D) None of the above

3. Which SQL command delete all the records and does not remove the structure?
   (A) Drop (B) Insert (C) Truncate (D) None of the above

4. The number of tuples in a relation is termed as .....
   (A) cardinality (B) entity (C) column (D) None of the above

5. A relation between two entities is treated as a single entity is called
   (A) Aggregation (B) Specialization (C) Generalization (D) None of the above

6. Let R(A,B,C,D) be a relational schema with following functional dependencies
   $A \rightarrow B$, $B \rightarrow C$, $C \rightarrow D$, $D \rightarrow B$
   Let R be decomposed into three relations R1(A, B), R2(B, C), R3(B, D)
   Which of the following statement is correct?
   (A) Gives a lossless Join and is dependency preserving
   (B) Gives a lossless Join but is not dependency preserving
   (C) Does not gives a lossless Join but is dependency preserving
   (D) Does not gives a lossless Join and is not dependency preserving

7. An operation on a relation X produces a relation Y s.t. Y contains only selected attributes of X. The operation was
   (A) Projection (B) Selection (C)Intersection (D)Union

8. In SQL, Wildcard characters are used with which of the operator.
   (A) LIKE (B) RANGE (C) BETWEEN (D) None of the above

9. Let r be a relation instance with schema R = (A, B, C, D).
   We define $r1=\pi A,B,C(r)$ and $r1=\pi A,D(r)$. Let $s=r1*r2$ where * denotes natural join. Given that the decomposition of r into r1 and r2 is lossy, which one of the following is TRUE?
   (A) $s \subset r$
   (B) $r1 \mid s = r$
   (C) $r \subset s$
   (D) $r * s = s$

10. The result which operation contains all pairs of tuples from the two relations, regardless of whether their attribute values match
    (A) Join (B) Cartesian product (C) Intersection (D) Set difference

Section B

This section is of 20 marks (05 Questions of 04 mark each)

11. Design an Entity Relationship Diagram (ERD) for a Vehicle Parking System with the following requirements:

Entities:

Driver Attributes: Attributes: driver_id, name

Vehicle Attributes: vehicle_id, registration_number

Parking Slot: Attributes: slot_id, slot_number, status (available/occupied)

Parking Ticket: Attributes: ticket_id, start_time, end_time, vehicle_id, slot_id

Relationships:

Driver owns Vehicle: One driver can own multiple vehicles.

Vehicle parks in Parking Slot: A vehicle parks in a slot.

Vehicle has Parking Ticket: Each parking event is associated with a ticket.

Parking Ticket assigned to Parking Slot: A ticket is issued for a specific slot.

12. Consider the following relations

Student(StudentID, Name, Age, DepartmentID)

StudentID: Unique identifier for the student (Primary Key)

Name: Name of the student

Age: Age of the student

DepartmentID: Foreign Key that links to the Department table

Department(DepartmentID, DepartmentName)

DepartmentID: Unique identifier for the department (Primary Key)

DepartmentName: Name of the department (e.g., Computer Science, Electrical Engineering)

Course(CourseID, CourseName, DepartmentID)

CourseID: Unique identifier for the course (Primary Key)

CourseName: Name of the course (e.g., Data Structures, Operating Systems)

DepartmentID: Foreign Key linking the course to the Department table

Enrollment(EnrollmentID, StudentID, CourseID, EnrollmentDate)

EnrollmentID: Unique identifier for the enrollment (Primary Key)

StudentID: Foreign Key linking to the Student table

CourseID: Foreign Key linking to the Course table

EnrollmentDate: Date when the student enrolled in the course

Write the SQL query to finds the student name, student id, and the number of courses the student is enrolled in for each student.

13. Given the following relation and functional dependencies, Find the candidate keys for the relation.

R(A, B, C, D, E). show working

FD = { A → B, B → C, A → D, C → E }

14. Consider the relation R(A,B,C,D,E) with the following set of functional dependencies

FD = { A→B, A→C, C→D, B→E }

Now suppose R is decomposed into two relations R1(A, B, C) and R2(B, D, E).

Is this a lossless or a lossy join decomposition give reason and show working

15. What are the conditions for a relation to be in second normal form. Elaborate

Section C

This section is of 20 marks (02 Questions of 10 mark each)

16. Consider the following relations

Book(BookID, Title, AuthorID, Genre)

Author(AuthorID, Name)

Member(MemberID, Name, MembershipDate)

Borrow(BorrowID, MemberID, BookID, BorrowDate, ReturnDate)

Write the SQL and RA expressions to Find the names of all authors whose books have been borrowed at least once by any member of the library

17. Consider the following relation R(A,B,C,D) with the functional dependencies

FD = { A→B, C→D }

Is the given relation R above in 2NF. Justify your answer. Show working

----------END----------