2024 (May)

BCA 4th Sem Examination

BCA409 : Database Management System

Time: 3hrs **Full Marks : 75**

Pass Marks: 30

There will be 10 (ten) questions in Part - A which carries 1 mark each. And all questions of Part – A is compulsory. Part – B contains 8 (eight) questions which carries 2 marks each, out of which 5 (five) questions need to be answered. Part - C contains 8 (eight) questions which carries 5 marks each, out of which 5 (five) questions need to be answered.
Part – D contains 5 (five) questions which carries 10 mars each, out of which 3 (three) questions need to be answered.

PART – A

Each question carries 1 mark and are compulsory. (10 x 1 = 10)

1. An entity set that does not have sufficient attribute to form a primary key.
   A) Simple Entity B) Weak Entity
   C) Primary Entity Set D) Strong Entity Set
2. What is rows of a relation known as?
   A) Degree B) Tuple C) Entity D) None of the above
3. Which one of the following refers to the copies of the same data (or information) occupying the memory space at multiple places.
   A) Data Repository B) Data Mining
   C) Data Redundancy D) Data Inconsistency
4. Rectangles in ER diagram represents
   A) Entity B) Attributes C) Tuples D) None of the above
5. BCNF is not used for cases where a relation has
   A) Two (or more) candidate keys
   B) Two candidate keys and composite

C) The candidate key overlap

D) Two mutually exclusive foreign keys

6. A functional dependency $X \rightarrow Y$ is trivial if

A) $X \supseteq Y$ B) $X \subseteq Y$ C) $X = Y$ D) $X \not\subset Y$

7. Which one of the following commands is used for removing (or deleting) a relation from the SQL database.

A) Delete B) Drop C) Remove D) All of the above

8. Which SQL statement is used to extract data from a database?

A) SELECT B) EXTRACT C) UPDATE D) DROP

9. Which operation is used to extract specified columns from a table?

A) Project B) Join C) Extract D) Substitute

10. Which of the following is preserved in execution transaction in isolation?

A) Atomicity B) Isolation C) Durability D) Consistency

PART – B

Answer any 5 (five) questions from the following : (5 x 2 = 10)

11. Define degree of relationship.
12. Define total and partial participation in DBMS.
13. Differentiate strong entity and weak entity.
14. What is recursive relation?
15. Define primary key and foreign key.
16. Explain THETA JOIN with a suitable example.
17. What is data redundancy in DBMS?
18. Define deadlock with an example.

PART – C

Answer any 5 (five) questions from the following: (5 x 5 = 25)

19. Explain the ARIES recovery algorithm.

20. Briefly explain Two-Phase Locking Techniques for concurrency control.
21. Explain with an example the different types of relationship in DBMS.
22. Define database transaction. Explain ACID properties of the database transaction.
23. Explain 1NF, 2NF, 3NF with example.
24. With an example, explain INSERT and UPDATE operation in SQL.
25. Given below are two set of FDs for a relation R {A, B, C, D, E}
    i) $A \rightarrow B, AB \rightarrow C, D \rightarrow AC, D \rightarrow E$
    ii) $A \rightarrow BC, D \rightarrow AE$
    Are they equivalent?
26. Differentiate between the two relational algebra operations SELECT and PROJECT with an example.

PART – D

Answer any 3 (three) questions from the following: (3 x 10 = 30)

27. Define entity and attributes. Explain with an example the different types of attributes.
28. Define ER model. Draw an ER model of the Banking database application considering the following constraints:
    A bank has many entities. Each customer has multiple accounts. Multiple customers belong to a single branch. Single customer can borrow multiple loans. A branch has multiple employees.
    Specify proper attributes and key attribute for each entity type and structural constraints on each relationship type.
29. What is functional dependency? Describe the interference rule of functional dependency. (Armstrong's Axiom)

30. Write the SQL queries for the following database schema:

Student (USN, NAME, BRANCH, PERCENTAGE, CITY)
Faculty (FID, FNAME, DEPARTMENT, DESIGNATION, SALARY)
Course (CID, CNAME, FID)
Enroll (EID, CID, USN, GRADE)

i) Retrieve the names of all the students whose starts with "S".

ii) List the names of the students enrolled for the course "BCA" and having "A" grade.

iii) Retrieve the name of all the Faculty whose salary is greater than the salary of all the Faculties in the "Computer Science" department

iv) Retrieve the number of Faculty working in the each department. The result should be in descending order of the number of Faculty.

v) Find the average, maximum and minimum salary of all Faculties of Mechanical Department.

31. Explain the ER-to-Relational Mapping Algorithm and map the given Company ER schema into a relational schema and specify the key attributes.

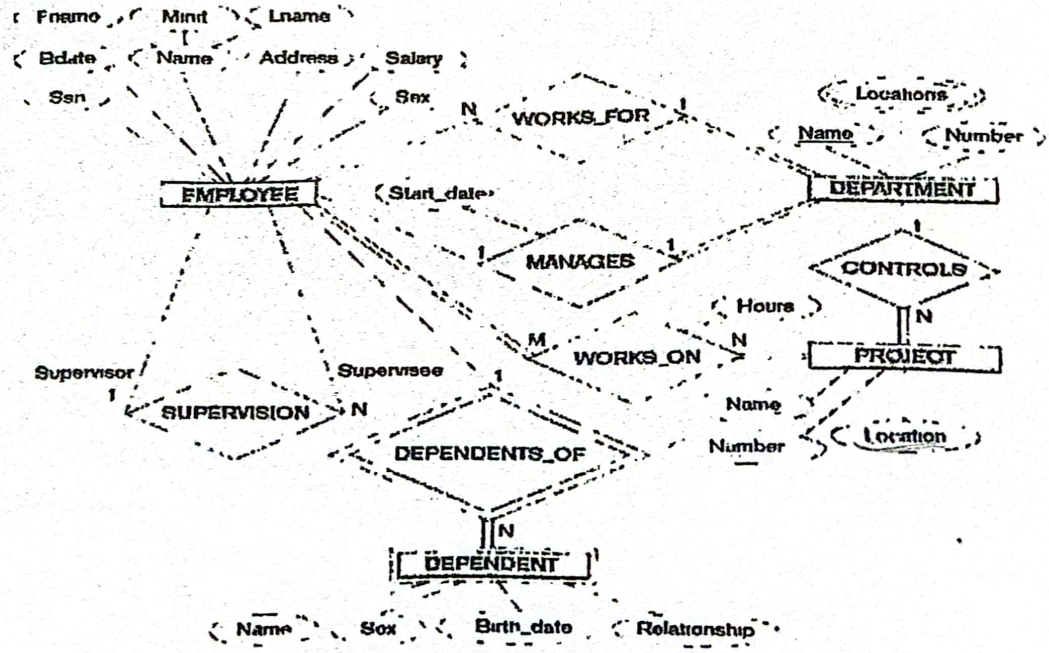

Fig: ER Schema of Company Database

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